

Part 1: Logical Reasoning

1. Find the next number in the sequence $7 : 48 :: 8 : ?$
 - a. 78
 - b. 65
 - c. 59
 - d. 63

2. Choose a number that is similar to the numbers in the set 579, 489, 363
 - a. 471
 - b. 284
 - c. 296
 - d. 167

3. Find the odd pair
 - a. 54-62
 - b. 70-80
 - c. 28-32
 - d. 21-24

4. A watch reads 7:30. If the minute hand points at West, in which direction will the hour hand point?
 - a. South-West
 - b. North-West
 - c. South-East
 - d. North-East

5. One early morning immediately after sunrise, I stood directly facing my house. I noticed that the shadow of the house fell to my left. In which direction was I facing?
 - a. South
 - b. North
 - c. East
 - d. West

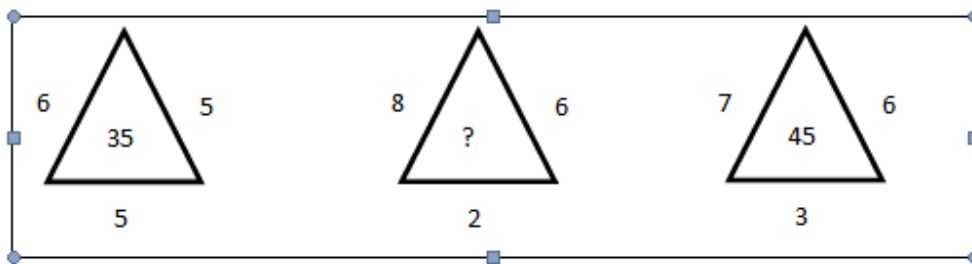
6. Complete the series: 11, 23, 48, 99, 202, ...

- a. 401
- b. 408
- c. 409
- d. 405

7. Complete the series: A, CD, GHI, ..., UVWXY

- a. LMNO
- b. MNO
- c. NOPQ
- d. MNOP

8. Find the missing number



- a. 55
- b. 50
- c. 36
- d. 40

9. Find the missing number

81	9
18	

84	12
14	

88	11
?	

- a. 18
 - b. 16
 - c. 25
 - d. 8
10. Other than noon and midnight, how many times do the hour and the minute hands cross each other?
- a. 11
 - b. 10
 - c. 9
 - d. 12
11. Five marbles of different colors are arranged in a line. You decide to arrange these marbles in different unique combinations, but move only one marble per minute. How much time will it take for you to arrange them in all possible combinations?
- a. One hour
 - b. One and half hours
 - c. Two hours
 - d. Two hours and 20 minutes
12. I told my daughter: "I was your present age when you were born". I am 40 years old now. How old will be my daughter 10 years from now?
- a. 10
 - b. 20
 - c. 30
 - d. 25

13. If $9 * 3 = 144$ and $6 * 3 = 81$, what is $10 * 2$?
- a. 100
 - b. 144
 - c. 104
 - d. 169
14. Five timers are set to ring at durations of 12 seconds, 15 seconds, 20 seconds, 25 seconds and 45 seconds. If they all ring together at 12:00 noon, when will they all ring together again next?
- a. 1:00 PM
 - b. 1:05 PM
 - c. 12:30 PM
 - d. 12:15 PM
15. Imagine that Dec 1st of some year is a Tuesday. When will the last Sunday of that year fall on?
- a. Dec 29th
 - b. Dec 27th
 - c. Dec 26th
 - d. Dec 30th
16. All students in a class are arranged in a line. You are 10th in the line from the beginning and I am 8th from the end. When we switch places, you are 25th from the beginning. How many students are in the class?
- a. 32
 - b. 29
 - c. 30
 - d. 34

17. A caterpillar climbs up a wall five meters every minute, but slips back two meters in the next minute. If it starts climbing a 90 meters tall wall at 5:00 AM, at what time will it touch the top of the wall?
- a. 6:00 AM
 - b. 5:30 AM
 - c. 5:59 AM
 - d. 6:01 AM
18. Pointing out to a photograph, a man tells his friend, “She is the daughter of the only son of my father’s only wife”. How is the girl in the photograph related to the man?
- a. Niece
 - b. Daughter
 - c. Sister
 - d. Cousin
19. How many numbers are there from 1 to 50, each of which is exactly divisible by 4 and also contain 4 as a digit in it?
- a. 4
 - b. 6
 - c. 3
 - d. 5
20. How many times are the hour and minute hands at 180° from each other in 24 hours?
- a. 24
 - b. 23
 - c. 22
 - d. 21

Part 2: Mathematics

21. If $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a - b\sqrt{3}$, then find values of 'a' and 'b'
- a = -2, b = 1
 - a = 2, b = 1
 - a = -2, b = -1
 - a = 2, b = -1
22. If $\sqrt{5} = 2.236$ and $\sqrt{3} = 1.732$, find the value of $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}}$
- 16.36
 - 19.268
 - 15.296
 - 4.47
23. When the price of onions reduced by 30%, I could buy 3 more kilograms of it at the same previous price of Rs 280. What was the original price of onions?
- 80
 - 40
 - 36
 - 24
24. What percentage of a full day is one hour and forty five minutes?
- 7.228%
 - 7.291%
 - 7.193%
 - None of these
25. Abdullah drank 77 glasses of milk in a week, each day drinking 3 more than the previous day. How many glasses of milk did he drink on the first day?
- 3
 - 5
 - 2
 - 1

26. You are given two fractions. Fraction A is twice Fraction B. The product of the two fractions is .
What is the value of fraction B?

- a. $1/25$
- b. $2/5$
- c. $1/5$
- d. None of these

27. What is the value of the expression

$$\frac{(x - y)^3 + (y - z)^3 + (z - x)^3}{(x - y)(y - z)(z - x)}$$

- a. 30
- b. 3
- c. $x + y + z$
- d. $x - y - z$

28. If $x + y + z = 0$, then $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy}$ is equal to

- a. 3
- b. 1
- c. -3
- d. 27

29. If $\left(\frac{a}{b}\right)^{(x-1)} = \left(\frac{b}{a}\right)^{(x-3)}$, find the value of x

- a. 4
- b. 3
- c. 2
- d. 1

30. For the equation $3x^2 + px + 3 = 0$, $p > 0$, if both the roots are the same, then p is equal to
- $\frac{1}{3}$
 - 6
 - 2
 -
31. If $\tan \theta = \frac{4}{3}$, what is the value of $\sqrt{\frac{1-\sin \theta}{1+\sin \theta}}$
- 3
 - $\frac{1}{3}$
 - $\frac{1}{4}$
 - 4
32. If $5 \tan \theta = 4$, find the value of $\frac{5 \sin \theta - 3 \cos \theta}{5 \sin \theta + 2 \cos \theta}$
- $\tan \theta$
 - $3 \tan \theta$
 - $\frac{1}{3}$
 - $\frac{1}{6}$
33. Two cars are driving on the road towards a building from opposite sides. The angles of elevation of the top of the building as observed from the two cars are 30° and 45° . If the building is 100 units high, the distance between the two cars is?
- 273 units
 - 500 units
 - 440 units
 - 370 units

34. The cost of carpeting a hall 20 feet long is Rs 40. Had the breadth been 3 feet less, the cost would have been Rs 25. Find the area of the hall.
- a. 360 ft²
 - a. 260 ft²
 - b. 160 ft²
 - c. 200 ft²
35. A drum manufacturer has decided to make the radius of the drum be twice as large. However, he still wants the drum to contain the same amount of liquid. What should be the new height of the drum?
- a. 40% smaller
 - b. 75% smaller
 - c. 50% smaller
 - d. 20% smaller
36. The diagonals of a rhombus are 48 cm and 64 cm. The height of the rhombus is
- a. 38.4 cm
 - b. 43.5 cm
 - c. 30.5 cm
 - d. 29 cm
37. The point on the x-axis which is the same distance from (5, 4) and (-2, 3) is
- a. (0, 0)
 - b. (2, 2)
 - c. (2, 0)
 - d. (1.5, 3.5)

38. If two dice are thrown, what is the probability of getting two numbers whose product is even?
- a. $1/2$
 - b. $1/3$
 - c. $5/16$
 - d. $3/4$
39. If $\frac{a^2-1}{a} = 2$, then the value of $\frac{a^6-1}{a^3}$
- a. 11
 - b. 12
 - c. 13
 - d. 14
40. If two triangles are on the same base and between the same parallels, then the ratio of their areas is
- a. 1:1
 - b. 1:2
 - c. 2:1
 - d. 1:3
41. A circle has a radius of 5 cm. You have a chord in it of length 8 cm. The distance of the chord from the center is
- a. 2 cm
 - b. 5 cm
 - c. 3 cm
 - d. 6 cm

42. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times. What is the probability that on a given day a forecast was correct?
- a. 0.8 b. 0.33 c. 0.75 d. 0.7
43. If mean = 110 and mode = 80, then the median is
- a. 90 b. 95 c. 105 d. 100
44. A spherical ball of radius 3 cm is melted and recast into three smaller spherical balls. If the radii of two of the balls are 1.5 cm and 2 cm, find the radius of the third ball.
- a. 2.5 cm b. 1.75 cm c. 1 cm d. 1.25 cm
45. Tony's grandmother was 8 times older than him 16 years ago. She would be 3 times of his age 8 years from now. Eight years ago, what was the ratio of Tony's age to that of his grandmother?
- a. 2:7 b. 11:53 c. 5:17 d. 3:8

Part 3: Physics

46. A person moves a certain distance in a certain time. If $\frac{1}{3}$ of the distance is covered in $\frac{2}{3}$ of the time with speed V_1 , and the rest of the $\frac{2}{3}$ distance in $\frac{1}{3}$ of the time speed V_2 , then V_1 / V_2 is

- a. $\frac{1}{2}$
- b. $\frac{1}{4}$
- c. $\frac{4}{9}$
- d. $\frac{2}{9}$

47. If one puts ones ears to the steel rail, the sound of a coming train can be heard even when the Train cannot be seen. One can conclude from this observation that

- a. Sound travels faster in steel than in air.
- b. Amplitude of sound in the rail is much larger than in air.
- c. Sound can travel larger distances in solids than in air.
- d. Quality of sound in rail is better than in air.

The reasonable conclusions are

- a. a and c
- b. a and b
- c. b and c
- d. b and d

48. Examine the following statements:

- a. When two bodies are rubbed against each other, the charges are created.
- b. When two bodies are rubbed against each other, charges in these bodies are redistributed.
- c. When two bodies are rubbed against each other, similar charges appear on each.
- d. When two bodies are rubbed against each other, dissimilar charges appear on both.

The correct statements are:

- a. All four
- b. None
- c. Only A and C
- d. Only B and D

49. Bottom of the bucket containing water appears to be raised; physical phenomenon behind it is:

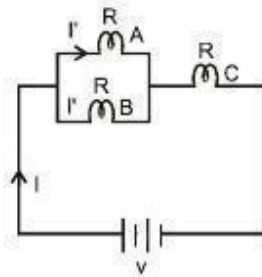
- a. Reflection of light

- b. Refraction of light
 - c. Diffraction of light
 - d. Dispersion of light
50. The type of motion with reference to friction in decreasing order is:
- a. rolling, static, sliding
 - b. rolling, sliding, static
 - c. static, sliding, rolling
 - d. sliding, static, rolling
51. Mohan moves 30 mts in a straight line towards East and then moves 40 mts to the South. Find his displacement:
- a. 70 mts
 - b. 20 mts
 - c. 50 mts
 - d. 60 mts
52. A vibrator generates the waves of the speed 330 m/s and wavelength 1.1 m. Then the frequency and timeperiod is
- a. 264 Hz, 0.0037 sec
 - b. 412.5 Hz, 0.0024 sec
 - c. 300 Hz, 0.0033 sec
 - d. 264 Hz, 0.0033 sec
53. When a stone is dropped into the lake, the produced waves are
- a. Transverse waves
 - b. Sound waves
 - c. Longitudinal waves
 - d. Electromagnetic waves
54. The power of the concave lens is 0.05 per cm. At what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens?
- a. 20 cm
 - b. 1/20 cm
 - c. 10 cm
 - d. 1/10 cm
55. The acceleration due to gravity of the earth is 9.8 m/s^2 and the radius of the earth is 6400 km. What is the approximate mass of the earth? Take Universal Gravitational constant $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{Kg}^2$:
- a. $6 \times 10^{24} \text{ kg}$
 - b. $6 \times 10^{20} \text{ kg}$
 - c. $9 \times 10^{24} \text{ kg}$
 - d. $9 \times 10^{20} \text{ kg}$

56. Which of the following correctly describes the magnetic field near a long straight wire?
- The field consists of straight lines perpendicular to the wire.
 - The field consists of straight lines parallel to the wire.
 - The field consists of radial lines originating from the wire.
 - The field consists of concentric circles centred on the wire.
57. Boiling point of water in Fahrenheit scale is
- 180 deg F
 - 158 deg F
 - 100 deg F
 - 212 deg F
58. Heat supplied to a substance at its melting point is used for
- Rise in temperature
 - Change of state
 - Both (1) and (2)
 - Doing work
59. A car is moving with a constant speed of 70 km/h. Which of the following statements is correct ?
- The acceleration of the car is definitely zero.
 - The car has an acceleration only if it is moving along a curved path
 - The car may have an acceleration even if it is moving along a straight path
 - The car may not have an acceleration even if it is moving along a curved path
60. A box of mass 20 kg is pushed along a rough floor with a velocity 2 m/s and then let go. The box moves 5 m on the floor before coming to rest. What must be the frictional force acting on the box ?
- 4 N
 - 2 N
 - 20 N
 - 8 N

61. A spring balance measures the weight of an object in air to be 0.1 N. It shows a reading of 0.08 N when the object is completely immersed in water. If the value of acceleration due to gravity is 10m/s^2 . The volume of the object is
- 20 cm^3
 - 80 cm^3
 - 200 cm^3
 - 2 cm^3

62. Consider a simple circuit as shown containing a battery and three identical incandescent bulbs A, B and C. Bulb A is wired in parallel with bulb B and this combination is wired in series with bulb C. What would happen to the brightness of the other two bulbs if bulb A were to burn out?
- Only bulb B would get brighter.
 - Both B and C would get brighter.
 - Bulb B would get brighter and Bulb C would get dimmer.
 - There would be no change in the brightness of either bulb B or bulb C.



63. A ball of mass 0.20 kg falls freely from a certain height and rebounds elastically with a speed of 40 m/s. The change in momentum of the ball is
- 4 kg-m/s
 - 8 kg-m/s
 - 16 kg-m/s
 - 40 kg-m/s
64. The amount of energy consumed by a 10HP water pump in 10 minutes to lift the water to overhead tank is:
- 26.856 MJ
 - 4.476 MJ
 - 53.712 MJ
 - 13.428 MJ
65. A ray of light passes from denser medium to rarer medium. If the thickness of the denser medium is doubled, then the emerging angle is
- also doubled.
 - Reduced by its half.
 - Not affected.
 - Critical angle.

66. Inside the magnet, the field lines run
- From south to north
 - Away from north pole
 - From north to south
 - Away from south pole
67. When light passes through a prism, the colour which deviates the least is
- Red
 - Violet
 - Green
 - Blue
68. An electric fuse is based on
- the chemical effect of the current
 - the heating effect of the current
 - the magnetic effect of the current
 - None of these
69. Two charged bodies having equal potential are connected through a conducting wire. In this case
- current will flow.
 - current will not flow.
 - cannot say.
 - current will flow if a resistor is also connected.
70. A body of weight W is suspended from the ceiling of a room through a rope of weight R . The ceiling pulls the rope by a force of
- W
 - R
 - $W + R$
 - $(W + R)/2$

Part 4 : CHEMISTRY

71. How many electrons are present in second shell of Oxygen ?

- a) 2 b) 6 c) 8 d) 4

72. Most soluble in water is —

- a) Camphor b) Sugar
c) Sulphur d) Common Salt

73. The number of moles of solute present in 1 kg of a solvent is called its

- a) molality b) molarity
c) normality d) formality

74. The most electronegative atom among the following is

- a) Oxygen b) Fluorine
c) Nitrogen d) Helium

75. The metallurgical process in which a metal is obtained in a fused state is called

- a) smelting b) Roasting
c) calcinations d) froth floatation

76. Which solution is most acidic

- a) pH = 6 b) pH = 7 c) pH = 3 d) pH = 2

84. The action of water on quick lime is an example of which type of reaction?

- a) Combination b) Displacement c) Decomposition d) Redox

85. Following is the reactivity series in decreasing order of their reactivity -

Magnesium > Zinc > Iron > Lead > Copper > Silver > Gold

Which one of the following metals can displace copper from copper sulphate solution?

- a) Zn b) Ag c) Au d) None

86. The method that cannot be used for removing permanent hardness of water is

- a) adding sodium carbonate b) distillation
c) adding caustic soda d) Boiling

87. The hydronium ion is

- a) H^+ b) HO^- c) H^{2+} d) H_3O^+

88. Formalin is :

- a) 60 % formic acid b) 40 % formaldehyde
c) 60 % Acetic acid d) 40% Acetic acid

89. Which of the following pairs are bivalent metals?

- a) Zn, Al b) Fe, Al c) Ca, K d) Mg, Zn

90. Which of the following show variable valency?

- a) Mg b) Zn c) Fe d) K

91. The total number of covalent bonds in propane is

- a) 6 b) 8 c) 10 d) None of these

92. Which of the following compounds contain least number of oxygen in its molecules ?

- a) Nitric acid b) Sodium Carbonate
c) Sulphuric acid d) Zinc oxide

93. The oxygen atom has 8 protons and 8 electrons. The oxide ion O^{2-} will have

- a) 8 protons and 6 electrons
b) 6 protons and 8 electrons
c) 8 protons and 10 electrons
d) 8 protons and 16 electrons

94. The total number of atoms present in 3 moles of water is

- a) 6.02×10^{23} b) 3×10^{23} c) 1.806×10^{24} d) 12.04×10^{24}

95. Which of the following statements is wrong about alkynes?

- a) They have general formula C_nH_{2n-2}
b) They have carbon – carbon triple bond
c) They have general formula C_nH_{2n}
d) The first member is ethyne

Part 5: BIOLOGY

96. A cross is made between true breeding tall and dwarf pea plants, in F_1 generation all plants appear tall. Upon selfing F_1 hybrids in F_2 generation, both tall and dwarf plants appear. Which principle of inheritance is explaining this genetic phenomenon is
- Law of dominance
 - Law of segregation
 - Law of unit character
 - Law of independent assortment.
97. Cold treatment given to the seeds for the induction of early flowering is
- Photoperiodism
 - Vernalization
 - Photorespiration
 - Cryopreservation
98. Light reaction of photosynthesis occurs in grana of chloroplast and it results in formation of following assimilatory powers is
- ATP
 - $NADPH + H^+$
 - O_2
 - Both a and b
99. Which of the following acts as antitranspirant
- Gibberalic acid
 - Auxin
 - Ethylene
 - Phenyl mercuric acetate
100. The RQ value becomes one when
- Oxygen consumed more than CO_2 evolved.
 - Oxygen consumed less than CO_2 evolved.
 - Oxygen consumed equals to CO_2 evolved.
 - Respiration stops.
101. Causative agent for tuberculosis is
- Mycobacterium leprae*
 - Mycobacterium tuberculosis*
 - Yersinia pestis*
 - Vibrio cholera*

102. If DNA contains 15% Adenine find out the percentage of C+G
- 15%
 - 70%
 - 35%
 - 20%
103. What happens when RBCs are kept in distilled water
- Swelling due to endosmosis and finally burst
 - Swelling due to endosmosis but do not burst
 - No change at all
 - RBC undergoes shrinking
104. G.J. Mendel conducted experiments upon
- Allium cepa
 - Drosophila melanogaster
 - Pisumsativum
 - Cucurbitapepo
105. If both sperm and ovum contain 7 chromosomes, the resulting embryo contains _____ chromosomes.
- 7
 - 3.5
 - 14
 - 7.5
106. Which of the following are the symptoms of diabetes mellitus
- Polyurea
 - Glycosurea
 - Ketonurea
 - All of these
107. Which of the following are responsible for acid rain
- CO₂
 - CO
 - NO₂
 - CH₄
108. Osteoporosis i.e. weakening of bones is caused by the hypersecretion of _____ hormone
- Insulin
 - Parathormone
 - Thyrosine
 - Thyroxine

109. Saliva contains _____ enzymes
- Ptyalin
 - Pepsin
 - Rennin
 - Trypsin
110. Milk teeth contain total _____ teeth
- 10
 - 25
 - 20
 - 32
111. During which stage of cell division crossing over occurs
- Zygotene
 - Pachytene
 - Diplotene
 - Leptotene
112. The valve present in human heart between Right Atrium and Right Ventricle is
- Bicupsid
 - Semilunar
 - Tricusid
 - Eustachian
113. Programmed cell death is called
- Endocytosis
 - Apoptosis
 - Phagocytosis
 - Pinocytosis
114. The normal blood pressure is 120/80 mmHg. The normal pulse pressure is
- 40 mmHg
 - 200 mmHg
 - 1.5 mmHg
 - 9600 mmHg
115. During which stage of cell division centromere splits
- Metaphase
 - Telophase
 - Prophase
 - Anaphase

116. Root hairs are
- Unicellular
 - Multicellular
 - Binucleated
 - Multinucleated
117. Antimicrobial activity in tears is due to which enzyme
- Pepsin
 - Lysozyme
 - None of these
 - Trypsin
118. Maintenance of body posture is due to which part of the brain
- Hypothalamus
 - Cerebrum
 - Cerebellum
 - Medulla
119. The ability of a single plant cell to develop into a whole plant is called
- Pluripotency
 - Totipotency
 - Unipotent
 - All of these
120. Which blood group lacks blood antigens
- A
 - B
 - AB
 - O

-----End of Question Paper-----