MENTORS EDUSERV

SCHOLASTIC APTITUDE TEST [ME-SAT]

SAMPLE TEST PAPER

[For Students going to Class 10 in 2021]

Time : 2 hours **Maximum Marks: 300**

DO NOT BREAK THE SEALS ON THIS BOOKLET, AWAIT INSTRUCTIONS FROM THE INVIGILATOR.

INSTRUCTIONS

[A] General

1. This Question paper contains **FIVE** Parts, **A to E** (Physics, Chemistry, Mathematics, Biology & Mental Ability).
2. This Question Paper contains **15 pages** including cover page**.**
3. This question paper contains total **100 questions** (**20** questions each in Physics, Chemistry, Mathematics, Biology and Mental Ability).
4. The Question Paper has blank spaces at the bottom of each page for rough work. No additional sheets will be provided for rough work.
5. Blank papers, clip boards, log tables, slide rule, calculators, cellular phones, pagers and electronic gadgets, in any form, are **NOT** allowed.
6. The **OMR** (Optical Mark Recognition) sheet shall be provided separately.

[B] Answering on the OMR

7. In all the parts, each question will have **4 choices** out of which **only one choice is correct**.
8. Darken the bubble with **Ball Pen (Blue or Black) ONLY.**

[C] Filling OMR

9. On the **OMR sheet**, fill all the details properly and completely, otherwise your OMR will not be checked.
10. Do not write anything or tamper the barcode in the registration no. box.

[D] Marking Scheme:

11. For each question you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY** and **zero (0) marks** if no bubble is darkened. In all other cases, **minus one (–1) mark** will be awarded.

SEAL

Name :.....

Registration No.: | | | | | | | | | | | | | | | |

PART-A : PHYSICS

1. The engine of a car produces an acceleration of 6 m/s^2 in the car. If this car pulls a block of the same mass, then the acceleration would be

(A) 6 m/s^2 (B) 12 m/s^2 (C) 3 m/s^2 (D) 1.5 m/s^2

2. Pascal

(A) is a unit of pressure (B) is unit of force

(C) is a unit of energy (D) is a vector quantity

3. Which of the following is true about static friction ?

(A) It is automatically self-adjusting. (B) It always opposes motion.

(C) It is not helpful in walking. (D) None of the above

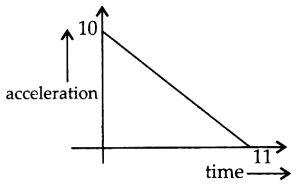
4. The initial velocity of a particle is 10 m/s and its retardation is 2 m/s^2. The distance moved by the particle in 5^{th} second of its motion is

(A) 31 m (B) 52 m (C) 1 m (D) 1 cm

5. A ball thrown vertically upwards with a speed of 19.6 m/s from the top of a tower returns to the ground in 6s. Find the height of tower.

(A) 60 m (B) 52.7 m (C) 55.8 m (D) 58.8 m

6. A particle starts from rest. Its acceleration (a) versus time (t) is as shown in the figure. The maximum speed of the particle will be



(A) 110 m/s (B) 55 m/s (C) 550 m/s (D) 660 m/s

7. An iron ball and aluminium ball has same mass then

(A) inertia of iron is greater than that of aluminium.

(B) both the ball have same inertia.

(C) inertia of iron is less than that of Aluminium.

(D) None of these

8. A gun of mass 1 kg fires 4 bullets per sec each of mass 20 g with a velocity 300 m s^{-1}. The force required to hold the gun is

(A) 24 N (B) 28 N (C) 32 N (D) 10 N

9. Force of friction is directly proportional to

(A) size (B) area

(C) Normal reaction (D) None of these

10. A body of mass 2 kg collides with a wall with speed 100 m/s and rebounds with the same speed. If the time of contact was 1/50 s, the force exerted on the wall is

(A) 8×10^3 N (B) 2×10^4 N (C) 4×10^4 N (D) 10^4 N

11. A truck running along a straight line increases its speed uniformly from 30 m/s to 60 m/s in a time interval of 1 min. The distance travelled during this time interval is

(A) 900 m (B) 1800 m (C) 2700 m (D) 3600m

12. Choose the correct statement.

(A) Action and reaction forces act on same object.

(B) Action and reaction forces act on different objects.

(C) both (A) and (B) are possible.

(D) Neither (A) nor (B) is correct.

13. A bullet of mass 'a', velocity 'b' is fired into a large block of wood of mass 'c' which is at rest. After that, both the block of wood and bullet move with a common velocity 'v', then find the common velocity.

(A) $\frac{ab}{a+c}$ (B) $\frac{ab}{a-c}$ (C) $\frac{a+b}{a+c}$ (D) $\frac{b-a}{a+c}$

14. A ball dropped from a height 'h' reaches the ground in time 'T'. What is its height from the ground at time T/2?

(A) $\frac{h}{9}$ (B) $\frac{h}{4}$ (C) $\frac{h}{2}$ (D) $\frac{3h}{4}$

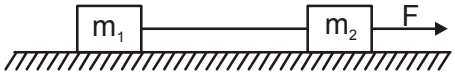
15. A car moving at a speed of 20 m/s undergoes uniform retardation of 5 m/s^2. It stops in a time of

(A) 100 s (B) 4 s (C) 3 s (D) 5 s

16. A particle moves for 20 seconds with velocity 3 m/s and then with velocity 4 m/s for another 20 seconds and finally moves with velocity 5 m/s for next 20 seconds. What is the average velocity of the particle ?

(A) 3 m/s (B) 4 m/s (C) 5 m/s (D) zero

17. In the shown figure, if F = 20 N, $m_1 = m_2 = 3$ kg and the acceleration is 0.5 m/s^2 If the friction forces on the two blocks are equal, what is the magnitude of frictional force on either block?

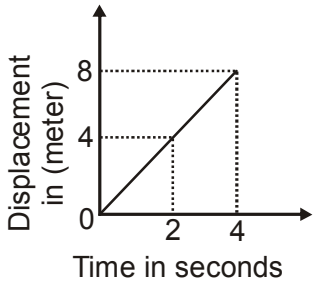


(A) 10 N (B) 17 N (C) 8.5 N (D) 0 N

18. Area under a velocity-time graph represents a physical quantity which has the unit

(A) m^2 (B) m (C) m^3 (D) m s^{-1}

19. Displacement-time graph of an object of mass 2 kg is shown in fig. The force required to move the object for first four seconds is



(A) 0 N (B) 4 N (C) 2 N (D) 8 N

20. Two bodies A and B of masses 100 g and 200 g respectively are dropped near the earth's surface. Let the acceleration of A and B be a_1 and a_2 respectively. Then

(A) $a_1 = a_2$ (B) $a_1 < a_2$ (C) $a_1 > a_2$ (D) $a_1 \neq a_2$

PART-B : CHEMISTRY

21. Two substances P and Q when brought together, form substance R with the evolution of heat. The properties of R are different from both P and Q. What is substance R?

(A) A compound (B) An element (C) A metal (D) A mixture

22. Which of the following pairs of colloidal solutions have dispersed phase as liquid and dispersing medium as gas?

(A) Fog, mist (B) Butter, milk (C) Fog, smoke (D) Smoke, foam

23. Which of the following is a true solution?

(A) Copper in gold (B) Sulphur in water

(C) Milk (D) KCl in sulphur dioxide

24. Which of the following solutions shows Tyndall effect?

(A) A solution of common salt (B) A solution of sodium carbonate

(C) Starch solution (D) Sugar solution

25. The size of a colloidal particle is

(A) 10^{-1} to 10^{-3} cm. (B) 10^{-5} to 10^{-7} cm.

(C) 10^{-8} to 10^{-5} cm. (D) 10^{-6} to 10^{-8} cm.

26. Which of these statements is/are true?

(A) The components of a suspension can be separated by filtration.

(B) The particles of a colloid can pass through a filter paper.

(C) The constituents of a compound can be separated easily.

(D) Both (A) and (B)

27. At what temperature should all the gases occupy zero volume?

(A) O°C (B) –273°C (C) 273°C (D) 100°C

28. On which of the following factors, does the molecular arrangement of a substance depend?

(A) Temperature and pressure

(B) Concentration and temperature

(C) Temperature, pressure and concentration

(D) Volume and pressure

29. What does conversion of 475 K into celsius scale give?

(A) 301.85 °C (B) 273 °C (C) 207°C (D) 201.85°C

30. Which of the following properties is different for solids, liquids and gases?

(A) Movement of molecules (B) Particle size of the substance

(C) Mass of the substance (D) Energy changes

31. Identify the freezing point of pure water.

(A) –4 °C (B) 100°C (C) 10 °C (D) 0°C

32. Which of the following is a suspension ?

(A) Alcohol in water (B) Common salt in water

(C) Barium sulphate in water (D) Sucrose in water

33. What happens when ice is converted into water?

(A) Heat is absorbed. (B) Heat is released.

(C) Temperature increases. (D) Temperature decreases.

34. Which of the following processes involve absorption of energy?

(i) Boiling (ii) Sublimation (iii) Condensation

(A) Only (i) and (ii) (B) Only (ii) and (iii)

(C) Only (i) and (iii) (D) (i), (ii) and (iii)

35. Which of the following apparatus is used to separate a mixture of immiscible liquids?

(A) Centrifuge (B) Condenser

(C) Separating funnel (D) Distillation flask

36. What is the technique used to separate dirt particles from clothes in a washing machine?

(A) Magnetic separation (B) Filtration

(C) Evaporation (D) Centrifugation

37. What kind of change is undergone when an electric bulb glows?

(A) A physical change

(B) A chemical change

(C) Both a physical and a chemical change

(D) A permanent change

38. Which of the following is a solid-in-solid colloid?

(A) Shaving cream (B) Milk of magnesia

(C) Milky glass (D) Cheese

39. What is a solution of Iodine in carbon tetrachloride called?

(A) Aqueous solution (B) Alcoholic solution

(C) Non-aqueous solutlon (D) Tincture of lodine

40. What kind of solution is drinking soda?

(A) Gas in liquid (B) Liquid in gas (C) Gas in gas (D) Solid in liquid

PART-C : MATHEMATICS

41. The points (– 2, 10), (– 2, 2) and (6, 2) are the vertices of

(A) an equilateral triangle (B) a right-angled isosceles triangle

(C) a scalene triangle (D) an obtuse-angled triangle

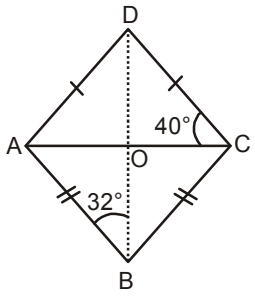
42. The value of 'n' for which the expression $9x^4 - 12x^3 - nx^2 - 8x + 4$ becomes a perfect square is

(A) 12 (B) 16 (C) 18 (D) 24

43. The autorikshaw fare in a city is charged Rs. 10 for the first kilometer and Rs. 4 per kilometer for subsequent distance covered. Then the linear equation to express the above statement (Let total distance be x km and fare charged Rs. y) is

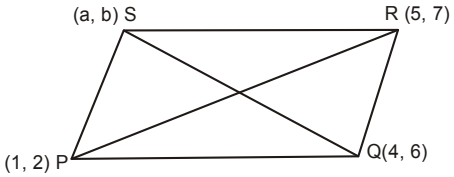
(A) y = 4x + 6 (B) y = 4x – 6 (C) y = 10x + 4 (D) None of these

44. In the adjoining kite ABCD, diagonals intersect at O. If $\angle ABO = 32°$ and $\angle OCD = 40°$ then $\angle BAD$ is equal to



(A) 98° (B) 78° (C) 88° (D) None of these

45. In the given figure, if P(1, 2), Q(4, 6), R(5, 7) and S(a, b) are the vertices of a parallelogram PQRS, then



(A) a = 2, b = 4 (B) a = 3, b = 4 (C) a = 2, b = 3 (D) a = 3, b = 5

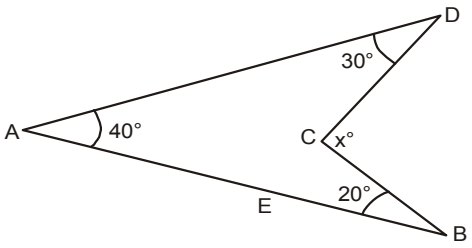
46. If $\left[\left\{\left(\frac{1}{7^2}\right)^{-2}\right\}^{-1/3}\right]^{\frac{1}{4}} = 7^m$, then the value of m is

(A) – 3 (B) 1/3 (C) – 1/3 (D) – 1

47. The value of p and q, if (x + 3) and (x – 4) are factors $x^3 - px^2 - qx + 24$

(A) p = 2, q = 9 (B) p = 1, q = 8 (C) p = 3, q = 10 (D) None of these

48. In the given figure the value of x° is



(A) 95° (B) 85° (C) 80° (D) 90°

49. If centres and one end of diameter of circle are respectively (5, 6) and (7, 8) then sum of ordinate and abscissa of other end is equal to

(A) 5 (B) 6 (C) 4 (D) 7

50. When simplified the product $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1+\frac{1}{4}\right).....\left(1+\frac{1}{n}\right)$ becomes

(A) n (B) $\frac{n-1}{2}$ (C) $\frac{n+1}{2}$ (D) $\frac{n}{2}$

51. Which of the following equations represents a line parallel to y-axis ?

(A) 2y = 5x (B) 2y = 5 (C) 2x = 5 (D) 2x + 3y = 5

52. If $\frac{2^{m+n}}{2^{n-m}} = 64$ and $a = 5^{1/7}$, then evaluate : $\frac{\left(a^{3m+n-p}\right)^2}{\left(a^{m-2n+2p}\right)^{-1}}$

(A) 100 (B) 125 (C) 225 (D) 250

53. If $3^x + 5^y = 52$ and $3^{x-1} + 5^{y-1} = 14$, then find the value of : $\left(\frac{5xy}{3}\right)$

(A) 4 (B) 6 (C) 8 (D) 10

54. If $x = \frac{\sqrt{5}+\sqrt{3}}{\sqrt{80}-\sqrt{45}+\sqrt{48}-\sqrt{27}}$, then find the value of : $\left(4x^2+5x-6\right)$

(A) 2 (B) 12 (C) 3 (D) 15

55. The polynomial $f(x) = px^2 + qx + 6$ on division by (2x + 1) leaves remainder as 1. Another polynomial, $g(x) = 2qx^2 + 6x + p$ on division by $(3x-1)$ leaves remainder as 2. Then find the value of $\left(p^2+q^2\right)$:

(A) 90 (B) 85 (C) 64 (D) 105

56. The HCF of 3240, 3600 and a third number is 36 while their LCM is $2^4 \times 3^5 \times 5^2 \times 7^2$. Then the third number is :

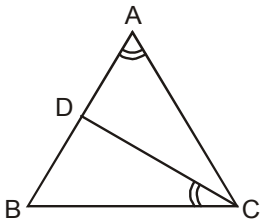
(A) $2^2 \times 5^3 \times 7^2$ (B) $2^5 \times 5^2 \times 7^2$ (C) $2^2 \times 3^5 \times 7^2$ (D) $2^3 \times 3^5 \times 7^2$

57. For the given system of linear equations, evaluate : $\left(\frac{p+3}{q-3}\right)$

$$\frac{1}{3p+q}+\frac{1}{3p-q}=\frac{3}{4}, \quad \frac{1}{2(3p+q)}-\frac{1}{2(3p-q)}=-\frac{1}{8}$$

(A) 1 (B) -2 (C) -1 (D) 2

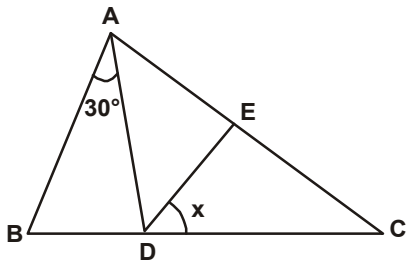
58. In the figure below, $\angle BAC = \angle BCD, BD = 9cm, CD = 6cm$ and $BC = 12$ cm. Then evaluate, $\frac{\text{perimeter}(\Delta ADC)}{\text{perimeter}(\Delta ABC)}$



(A) 7 : 12 (B) 8 : 9

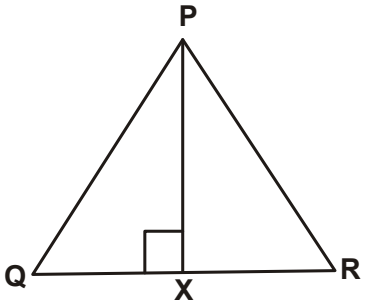
(C) 9 : 16 (D) 3 : 4

59. In the figure below, AB = AC, AE = AD, $\angle BAD = 30°$, $\angle CDE = x$, then value of x is



(A) 15° (B) 20° (C) 25° (D) 30°

60. In Δ PQR, PX $\perp$ QR. Find the value of $PQ^2 + QR^2 - 2QR.QX$



(A) PR^2 (B) $2\ PR^2$

(C) $QR^2.QX^2$ (D) $2\ PR^2 + PQ^2$

PART-D : BIOLOGY

61. Using fertilizers in farming is an example of

(A) No cost production (B) Low cost production

(C) High cost production (D) None of these

62. Nitrogen, phosphorus and potassium are examples of

(A) Micro-nutrients (B) Macro-nutrients (C) Fertilizers (D) Both I and II

63. What is the function of nuclear pores?

(A) To allow cells to communicate with one another

(B) To aid in the production of new nuclei

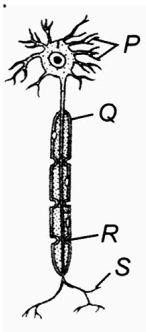
(C) To allow molecules such as proteins to move into and, out of the nucleus

(D) To form connections between different organelles

64. Cyperinus and Parthenium are types of

(A) Diseases (B) Pesticides (C) Weeds (D) Pathogens

65. Which of the following statement is correct about the cell shown in figure ?



(A) P receives nerve impulse from Q and conveys it to other cells.

(B) P conducts impulse away from cyton while S conducts impulse towards cyton.

(C) R is called node of Ranvier.

(D) All of these

66. Mullets, prawns, mussels are examples of

(A) Marine fishes (B) Fresh water fishes

(C) Finned fishes (D) Shell fish

67. Which cell organelle 'plays a crucial role in detoxifying many poisons and drugs in a cell?

(A) Golgi apparatus (B) Lysosomes

(C) Smooth endoplasmic reticulum (D) Vacuoles

68. What is the other name for Apis cerana indica ?

(A) Indian cow (B) Indian buffalo (C) Indian bee (D) None of the above

69. Why does salted cucumber slice exudes water?

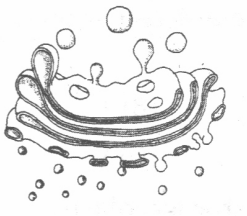
(A) Due to active transport (B) Due to filtration

(C) Exosmosis (D) Endomosis

70. The management and production of fish is called

(A) Pisciculture (B) Apiculture (C) Sericulture (D) Aquaculture

71. Observe and identify most important function of the cell organelle shown in the diagram.



(A) formation of glycoprotein (B) synthesis of carbohydrates

(C) packaging of materials (D) formation of cell wall

72. Rohu and Catla are types of

(A) Freshwater fish (B) Marine water fish

(C) Both (A) and (B) (D) None of these

73. The walls of cork cells are thickened by the deposition of an organic substance which make these cells impermeable to water and gases. This substance is

(A) Pectin (B) Suberin (C) Lignin (D) None of these

74. Why do eukaryotic cells have membrane bound compartments?

(A) To add complexity

(B) To carry genetic information

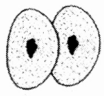
(C) To synthesise protein

(D) To separate diverse kinds of chemical reactions

75. Find the odd one.

(A) Leucoplast (B) Chromoplast (C) Chloroplast (D) Tonoplast

76. Choose the cell that transport oxygen

(A)  (B)  (C)  (D) 

77. Which of the following statement regarding apical meristem is incorrect ?

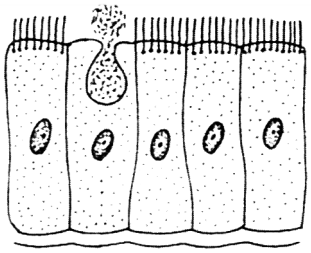
(A) It brings about increase in length of the root and stem.

(B) It develops by dedifferentiation of permanent tissues.

(C) It constitutes primary meristem.

(D) None of these

78. The tissue shown here is _____



(A) Simple squamous epithelial tissue

(B) Striated muscle tissue

(C) Areolar tissue

(D) Ciliated columnar epithelial tissue

79. The matrix of bone is in the form of thin concentric rings, called _____ Bone cells, called _____ are present in fluid filled spaces called _____ . These fluid filled spaces of the bone communicate with each other by network of fine canals, called _____

Select the correct sequence of words to complete the above passage.

(A) Lacunae, Osteoblasts, Lamellae, Canaliculi

(B) Lamellae, Osteocytes, Lacunae, Canaliculi

(C) Lamellae, Chondrocytes, Canaliculi, Lacunae

(D) Lacunae, Adipocytes, Canaliculi, Sarcoplasm

80. A person met with an accident in which two long bones of hand were dislocated. Which among the following may be the possible reason?

(A) Tendon break

(B) Break of skeletal muscle

(C) Ligament break

(D) Areolar tissue break

PART-E : MENTAL ABILITY

DIRECTION : In each of the following questions, there is a certain relationship between two given words on one side of (::) and one word is given on another side (::) while another word is to be found from the given alternatives having the same relation with this word as the words of the given pair bear. Choose the correct alternative.

81. Birds : Ornithology : : Diseases : ?

(A) Citology (B) Mycology (C) Pathology (D) Phycology

82. Calendar : : Dates : : Dictionary ?

(A) Vocabulary (B) Language (C) Words (D) Book

DIRECTION : In the following questions, two words are given which are related to each other in a particular manner and you have to find the word from the alternatives which bears exactly same relationship to the third word, as the first two bear.

83. PS : KH : : CD : ?

(A) VU (B) WX (C) UV (D) XW

84. 08 : 28 : : 15 : ?

(A) 63 (B) 65 (C) 126 (D) 124

85. Which letter comes in the middle of 12^{th} letter from left and 19^{th} letter from right ?

(A) L (B) J (C) N (D) O

86. If in a certain code language 'nik ka pa' means 'who are you', 'ka na ta da' means 'you may come here' and 'ho ta sa' means 'come and go', then what does 'nik' mean in that language ?

(A) who (B) are (C) 'who' or 'are' (D) Data inadequate

87. If in a certain code language 'how can you go' is written as 'ja da ka pa'; 'you come here' is written as 'na ka sa' and 'come and go' is written as 'ra pa sa', then how will 'here' be written in that language ?

(A) ja (B) na (C) pa (D) Data inadequate

DIRECTION : In the following series, replace the question mark (?) with the suitable option.

88. 30, 42, 56, 72, 90, _____ ?

(A) 115 (B) 112 (C) 110 (D) 108

89. 110, 132, 156, 182, 210, _____ ?

(A) 178 (B) 210 (C) 185 (D) 240

90. 78, 97, 118, 141, 166, _____ ?

(A) 163 (B) 193 (C) 181 (D) 203

DIRECTION : In the each of the following questions, one number is wrong in the series. Find out the wrong number.

91. 3691, 6931, 9361, 3691, _____ ?

(A) 6931 (B) 9631 (C) 9613 (D) 6913

DIRECTION : What comes in place of question mark(s) in the following letter series ?

92. ZBA, XFE, UJI, _____ ?

(A) QNM (B) OAB (C) TJI (D) ULK

93. OTE, PUF, QVG, RWH, ?

(A) SYJ (B) TXI (C) SXJ (D) SXI

DIRECTION : In the following letter series, some of the letters are missing which are given in that order as one of the alternatives below it. Select the correct alternative.

94. __ bc__ ca __ aba__ c__ ca

(A) bcbba (B) babac (C) bbcba (D) abcbb

DIRECTION : In following question, a set of figures carrying certain characters is given. Assuming that the characters in the set follow some pattern, find the missing character in the set.

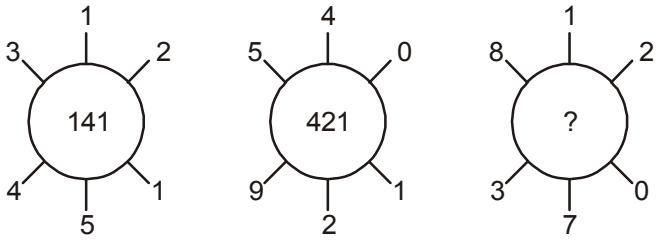
95.

1	2	3	36
4	2	3	81
1	7	5	?

(A) 225 (B) 169 (C) 196 (D) 144

DIRECTION : In the following question, which character when placed at the sign of interrogation (?) shall complete the given question.

96.



(A) 562 (B) 425 (C) 875 (D) 303

97. Meena correctly remembers that her father's birthday is after 18th May but before 22nd May. Her brother correctly remembers that their father's birthday is before 24th May but after 20th May. On which date in May was definitely their father's birthday ?

(A) 20th (B) 19th (C) 18th (D) None of these

98. If A means '×' B means '÷' C means '–' and D means '+', then

19 D 72 B 8 C 17 A 3 = ?

(A) 33 (B) 36 (C) 30 (D) 39

99. If A means '–', B means '÷', C means '+' and D means '×', then

(105 A 63 B 7) B 24 D 14 = ?

(A) 54 (B) 56 (C) 52 (D) 48

100. Identify the diagram that best represents the relationship among the classes given below
pen, pencil, stationary

(A)  (B)  (C)  (D) 

MENTORS EDUSERV

SCHOLASTIC APTITUDE TEST [ME-SAT]

SAMPLE TEST PAPER

[For Students going to Class 10 in 2021]

Time : 2 hours **Maximum Marks: 300**

PHYSICS

1.	(C)	2.	(A)	3.	(A)	4.	(C)	5.	(D)
6.	(B)	7.	(B)	8.	(A)	9.	(C)	10.	(B)
11.	(C)	12.	(B)	13.	(A)	14.	(D)	15.	(B)
16.	(B)	17.	(C)	18.	(B)	19.	(A)	20.	(A)

CHEMISTRY

21.	(A)	22.	(A)	23.	(A)	24.	(C)	25.	(B)
26.	(D)	27.	(B)	28.	(C)	29.	(D)	30.	(A)
31.	(D)	32.	(C)	33.	(A)	34.	(A)	35.	(C)
36.	(D)	37.	(A)	38.	(C)	39.	(C)	40.	(A)

MATHEMATICS

41.	(B)	42.	(B)	43.	(A)	44.	(A)	45.	(C)
46.	(C)	47.	(C)	48.	(D)	49.	(D)	50.	(C)
51.	(C)	52.	(B)	53.	(D)	54.	(C)	55.	(B)
56.	(C)	57.	(B)	58.	(A)	59.	(A)	60.	(A)

BIOLOGY

61.	(C)	62.	(B)	63.	(C)	64.	(C)	65.	(C)
66.	(A)	67.	(C)	68.	(C)	69.	(C)	70.	(A)
71.	(C)	72.	(A)	73.	(B)	74.	(D)	75.	(D)
76.	(A)	77.	(B)	78.	(D)	79.	(B)	80.	(C)

MENTAL ABILITY

81.	(C)	82.	(C)	83.	(D)	84.	(B)	85.	(B)
86.	(C)	87.	(B)	88.	(C)	89.	(D)	90.	(B)
91.	(A)	92.	(A)	93.	(D)	94.	(D)	95.	(B)
96.	(A)	97.	(D)	98.	(A)	99.	(B)	100.	(B)