



MENTORS EDUSERV SCHOLASTIC APTITUDE TEST (ME-SAT) SAMPLE TEST PAPER

[For Students presently in Class 8 going to Class 9 in 2019]

Time : 2 hours

Maximum Marks: 300

INSTRUCTIONS

[A] General

1. This Question paper contains **FIVE** Parts, **A to E** (Physics, Chemistry, Mathematics, Biology & Mental Ability).
2. This Question Paper contains **19 pages**.
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.

Name :

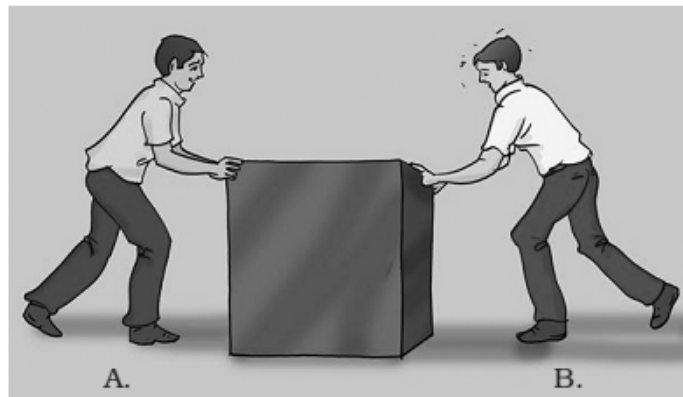
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DO NOT BREAK THE SEALS ON THIS BOOKLET, AWAIT INSTRUCTIONS FROM THE INVIGILATOR.

SEAL

PART-A : PHYSICS

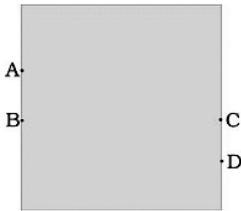
- When electric current is passed through a conducting solution, there is a change of colour of the solution. This indicates
 - the chemical effect of current.
 - the heating effect of current.
 - the magnetic effect of current.
 - the lightning effect of current.
- Which of the following metals is used in electroplating to make objects appear shining?
 - iron
 - copper
 - chromium
 - aluminium
- In Fig shown below, two boys A and B are shown applying force on a block. If the block moves towards the right, which one of the following statements is correct?



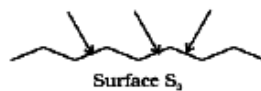
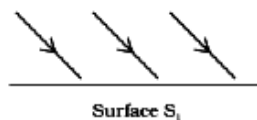
- Magnitude of force applied by A is greater than that of B.
- Magnitude of force applied by A is smaller than that of B.
- Net force on the block is towards A.
- Magnitude of force applied by A is equal to that of B.

Space for rough work

4.



- A water tank has four taps fixed at points A, B, C, D as shown in Fig. The water will flow out at the same pressure from taps at
- (A) B and C (B) A and B (C) C and D (D) A and C
5. To sharpen the blade of a knife by rubbing it against a surface, which of the following will be most suitable?
- (A) stone (B) plastic block (C) wooden block (D) glass block
6. Which of the following statements is incorrect?
- (A) Friction acts on a ball rolling along the ground.
 (B) Friction acts on a boat moving on water.
 (C) Friction acts on a bicycle moving on a smooth road.
 (D) Friction does not act on a ball moving through air.
7. Light is falling on surface S_1 , S_2 , S_3 as shown in Fig.



Surfaces on which the angle of incidence is equal to the angle of reflection is/are

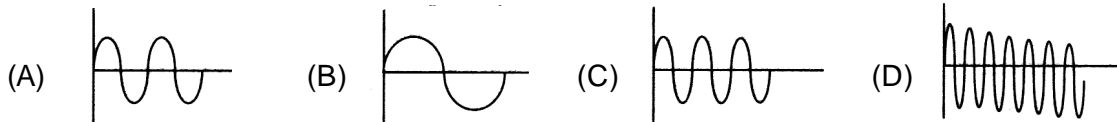
- (A) S_1 only (B) S_1 and S_2 only (C) S_2 and S_3 (D) all the three surfaces

Space for rough work

8. Which of the following statements is correct regarding rods and cones in the human eye?
- (A) Cones are sensitive to dim light. (B) Cones are sensitive to bright light.
(C) Rods are sensitive to bright light. (D) Rods can sense colour.
9. Which of the following statements are correct?
- (i) Sound is produced by vibrations.
(ii) Sound requires a medium for propagation.
(iii) Light and sound both require a medium for propagation.
(iv) Sound travels slower than light.
- (A) i & ii only (B) i, ii & iii only (C) ii, iii & iv only (D) i, ii & iv only
10. Pitch of sound is determined by its
- (A) frequency (B) amplitude (C) speed (D) loudness
11. Weight of a body is the product of :
- (A) mass and acceleration due to gravity (B) mass and gravitational constant
(C) mass and velocity (D) none of the above
12. Mass of a body is 5 kg. What is its weight? (Take $g = 9.8 \text{ ms}^{-2}$)
- (A) 98 N (B) 49 N (C) 24.5 N (D) Zero
13. Frictional force is important for motor racing.
This is because, frictional force
- (A) can help a car slow down
(B) can help a car move faster
(C) can help a car move around the corners without skidding
(D) all of these

Space for rough work

14. The force of friction between two bodies is :
- (A) parallel to the contact surface
 - (B) perpendicular to the contact surface
 - (C) inclined at 30° to the contact surface
 - (D) inclined at 60° to the contact surface
15. It is difficult to move a bike with its brakes on because :
- (A) rolling friction will be converted to sliding friction
 - (B) sliding friction will be converted to rolling friction
 - (C) rolling friction will be converted into static friction
 - (D) none of these
16. Which of them has highest frequency ?



17. Electricians use rubber gloves while working because :
- (A) rubber is an insulator
 - (B) rubber is a good conductor
 - (C) it is easy to work while wearing gloves
 - (D) none of these
18. Which objects use the reflection of light?
- (A) Kaleidoscope
 - (B) Plane mirror
 - (C) Side mirror of a car
 - (D) All of these

Space for rough work

19. The clear sky appears blue because :
- (A) blue light gets absorbed in the atmosphere.
 - (B) ultraviolet radiations are absorbed in the atmosphere.
 - (C) violet and blue lights get scattered more than the lights of other colours by the atmosphere.
 - (D) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere.
20. An object is placed at a distance of 10 cm from a plane mirror. If the object is moved 4 cm toward mirror, the relative change of distance of object and its image is :
- (A) 4 cm (B) 8 cm (C) 12 cm (D) 16 cm

PART-B : CHEMISTRY

21. Cotton is used to make clothes as it is/has
- (A) strong, heavy and absorbs perspiration
 - (B) low tensile strength, transparent and absorbs dyes
 - (C) light, soft, absorbs dyes and perspiration
 - (D) good conductor of heat.
22. This takes so many years to regenerate
- (A) wool (B) synthetic fibre (C) polyester (D) nylon
23. The ability of a material to bend without breaking and to return to its original shape is
- (A) flexibility (B) hardness (C) tensile strength (D) conductivity
24. The strength of a material to withstand a weight without breaking is
- (A) tensile strength (B) flexibility
- (C) hardness (D) metallic strength.

Space for rough work

25. Mark the correct statement.
- (A) Metals do not conduct electricity
 - (B) Bakelite is good conductor of heat
 - (C) A flexible object will never change its shape.
 - (D) Strength of an object refers to its ability to support a load without breaking.
26. A high molecular weight molecule built from a large number of simple molecules is called
- (A) monomer
 - (B) isomer
 - (C) polymer
 - (D) ester.
27. Which of the following is a linear polymer?
- (A) Nylon
 - (B) Bakelite
 - (C) Melamine
 - (D) Synthetic rubber
28. Thermoplastics are
- (A) linear polymers
 - (B) soften or melt on heating
 - (C) molten polymer can be moulded in any shape
 - (D) all are correct
29. A coil of copper wire can be made by pulling a larger piece of copper metal. This is due to which of the following properties of copper?
- (A) Malleability
 - (B) Ductility
 - (C) Tensile strength
 - (D) Conductivity
30. The metals are eaten away when they are exposed to water, oxygen and other chemicals. What is this process known as?
- (A) Oxidation
 - (B) Corrosion
 - (C) Galvanisation
 - (D) Amalgamation
31. Metal which does not react even with steam is
- (A) potassium
 - (B) iron
 - (C) magnesium
 - (D) silver.
32. The property of metals by virtue of which their surface shines, is
- (A) sonority
 - (B) ductility
 - (C) lustre
 - (D) malleability.

Space for rough work

33. The metal which is present in brass, bronze and German silver is
(A) Mg (B) Zn (C) Cu (D) Al
34. The metal that forms a self protecting film of oxide to prevent corrosion is
(A) Cu (B) Al (C) Pt (D) Au
35. Petroleum is found
(A) on the surface of the earth (B) in the atmosphere
(C) in arctic region (D) deep under the surface of the earth.
36. Natural gas has the main component as
(A) carbon dioxide (B) hydrogen
(C) methane (D) carbon monoxide.
37. Petrol or gasoline used as automobile fuel is a mixture of
(A) hydrocarbons (B) alcohols
(C) carbohydrates (D) hydrocarbons and alcohols.
38. Out of the following fractions of petroleum, the one having the lowest boiling point is
(A) kerosene (B) diesel oil (C) gasoline (D) heavy oil.
39. Most of the hydrocarbons from petroleum are obtained by
(A) fractional distillation (B) simple distillation
(C) destructive distillation (D) vaporisation.
40. The source of kerosene is
(A) coal tar (B) wood (C) crude petroleum (D) coal.

Space for rough work

PART-C : MATHEMATICS

41. Which of the following rational numbers lie between $\frac{-3}{7}$ and $\frac{-9}{8}$?
- (A) $\frac{-1}{2}$ (B) 0 (C) $\frac{12}{15}$ (D) None of these
42. $0.\overline{018}$ can be expressed in the rational form as :
- (A) $\frac{18}{1000}$ (B) $\frac{18}{990}$ (C) $\frac{18}{9900}$ (D) $\frac{18}{999}$
43. The value of $4 - \frac{5}{1 + \frac{1}{3 + \frac{1}{2\frac{1}{4}}}}$ is
- (A) $\frac{40}{31}$ (B) $\frac{4}{9}$ (C) $\frac{1}{8}$ (D) $\frac{31}{40}$
44. The unit digit in the expansion of $(44)^{44} + (55)^{55} + (88)^{88}$ is
- (A) 7 (B) 5 (C) 4 (D) 3
45. If $11^x = 3^y = 99^z$, then $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$ equals
- (A) $\frac{2}{z} - \frac{1}{y}$ (B) $\frac{2}{z} + \frac{1}{y}$ (C) $-\frac{1}{y}$ (D) 0

Space for rough work

46. Factorize the polynomial, $-r^2 + p^2 + q^2 - 2pq$
- (A) $(p - q - r)(p - q + r)$ (B) $(p + q + r)(p - q - r)$
 (C) $(p - q)(q - r)$ (D) $(p - r)(q - r)$
47. If $abc = 6$ and $a + b + c = 6$, then $\frac{1}{ac} + \frac{1}{ab} + \frac{1}{bc}$ equals
- (A) 2 (B) 1 (C) 3 (D) 0
48. In a rhombus ABCD, the diagonal intersect each other at O. If $\angle A = 60^\circ$ and $OA = 2$ cm, then the side of the rhombus is
- (A) 4 cm (B) $4\sqrt{3}$ cm (C) $2\sqrt{3}$ cm (D) None of these
49. What must be added to $9x^2 - 24x + 10$ to make it a whole square ?
- (A) 4 (B) 6 (C) 8 (D) none of these
50. $(2x + 3y)^2 - 5(2x + 3y) - 14$ is equal to
- (A) $(2x + 3y - 7)(2x + 3y + 2)$ (B) $(3x + 3y - 7)(2x + 3y + 2)$
 (C) $(2x + 4y - 7)(2x + 6y + 2)$ (D) none of these
51. If $(2x + 3)^2 + (2x - 3)^2 = (8x + 6)(x - 1) + 22$, then the value of x is equal to
- (A) -1 (B) 1 (C) -2 (D) none of these
52. The value of $\sqrt{8a^5b} \times \sqrt[3]{4a^2b^2}$ is
- (A) $4a^3b \sqrt[6]{2ab}$ (B) $2a^3b \sqrt[6]{ab}$ (C) $ab^3 \sqrt[6]{4ab}$ (D) $2ab^3 \sqrt[6]{2ab}$
53. Three numbers are in the ratio 2 : 3 : 4. The sum of their cubes is 33957, then the numbers are
- (A) 14, 21, 28 (B) 15, 30, 45 (C) 14, 20, 25 (D) 14, 24, 36

Space for rough work

54. The value of $\left[\left(\frac{1}{4}\right)^2 - \left(\frac{1}{4}\right)^3\right] \times 2^6$ is
- (A) 1 (B) 2 (C) 3 (D) 4
55. If $3^x = 500$, then the value of 3^{x-2} is
- (A) $\frac{100}{9}$ (B) $\frac{1000}{9}$ (C) $\frac{500}{9}$ (D) $\frac{500}{3}$
56. If $x = \frac{2(\sqrt{2} + \sqrt{6})}{3\sqrt{2} + \sqrt{3}}$, then x is equal to
- (A) $\frac{2}{3}$ (B) $\frac{3}{4}$ (C) $\frac{4}{3}$ (D) $\frac{16}{9}$
57. The value of $\sqrt{214 + \sqrt{130 - \sqrt{88 - \sqrt{44 + \sqrt{25}}}}}$ is
- (A) 14 (B) 15 (C) 16 (D) 17
58. The mean of ten items is x and if each item is increased by 4, then its new mean will be
- (A) $x + 4$ (B) $4x$ (C) $10x$ (D) $10 + x$
59. The value of $(16.1)^2 - (8.9)^2$ is
- (A) 160 (B) 180 (C) 170 (D) 150
60. The value of $(x + 3y)^2 + (x - 3y)^2$ is :
- (A) $2x^2 + 18y^2$ (B) $2x^2 - 18y^2$ (C) $2x^2 + 18y^2 - 2xy$ (D) $18x^2 + 2y^2$

Space for rough work

PART-D : BIOLOGY

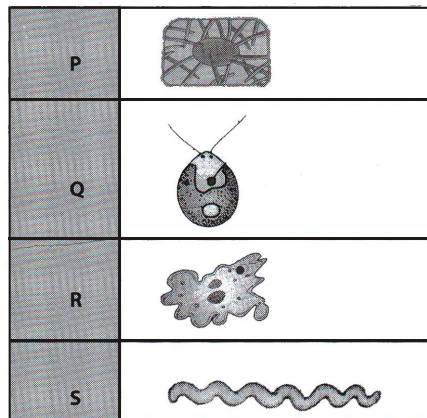
61. Which of the following sets of disease is caused by bacteria?
- (A) Tetanus, Cholera, Plague (B) Malaria, Leprosy, Plague
(C) Tetanus, Tuberculosis, Measles (D) Malaria, Mumps, Poliomyelitis
62. Who discovered the vaccine for small pox?
- (A) Louis Pasteur (B) Edward Jenner
(C) Alexander Fleming (D) Anton Van Leeuwenhoek
63. Bacteria that are not killed by antibiotics are called
- (A) Resistant (B) Reluctant (C) Infectious (D) Reactant
64. What are the causes for loss of biodiversity?
- (A) Habitat loss (B) Over exploitation
(C) Invasion of alien species (D) All the above
65. Which of the following tools would a farmer use to remove weeds from the field?
- (A) Hoe (B) Plough (C) Axe (D) Cultivator
66. Which of the following is **not true** for fertilisers?
- (A) They increase the yield.
(B) Their excessive use disturbs the balance of nutrients in soil.
(C) They are generally used in small quantity.
(D) They are environment friendly.
67. A disease in human beings caused by virus is _____
- (A) Typhoid (B) Influenza (C) Dysentery (D) Cholera

Space for rough work

68. Which one of the following statements is true about a Biosphere Reserve?
- (A) It is a protected area where only endemic species live.
 - (B) It is meant only for the conservation of plants and animals.
 - (C) It is meant to conserve both, the biodiversity and the culture of that area.
 - (D) There are no other protected areas within its limits.
69. Which statement is incorrect about endangered species?
- (A) Their number has decreased drastically.
 - (B) They might become extinct in the near future.
 - (C) They pose a danger to other animals.
 - (D) Their natural habitat needs to be protected.
70. A suitable term for the various components of cells is
- (A) Tissue (B) Cell organelles (C) Chromosomes (D) Genes
71. Of the following parts of a cell listed below, name the part that is common to plant cell, animal cell and a bacterial cell.
- (A) Chloroplast (B) Cell wall (C) Cell membrane (D) Nucleus
72. Identify the correct statement
- (A) Tissue is a group of dissimilar cells.
 - (B) An organ consists of similar cells.
 - (C) Vacuoles are not found in plant cells.
 - (D) Prokaryotes do not have nucleus.
73. Besides carbon, hydrogen and oxygen, the synthesis of proteins by plants require :-
- I. Magnesium II. Nitrogen III. Potassium
- (A) I only (B) III only (C) II only (D) II and III only

Space for rough work

74. The figures given below shows four types of microorganisms P, Q, R and S. What microorganisms are represented by P, Q, R and S respectively ?



- | P | Q | R | S |
|--------------|----------|----------|----------|
| (A) Bacteria | Protozoa | Viruses | Algae |
| (B) Protozoa | Viruses | Algae | Bacteria |
| (C) Viruses | Algae | Protozoa | Bacteria |
| (D) Algae | Protozoa | Bacteria | Viruses |

75. Read the statements given below

- (i) Seeds require moisture for germination.
- (ii) Plants can absorb nutrients mostly in dissolved form.
- (iii) Irrigation protects crops from both frost and hot air currents.
- (iv) Irrigation improves soil texture.

Choose the combination of statements which indicate the need to irrigate crops.

- (A) i and ii (B) i, ii, iii (C) i, ii, iii, iv (D) i and iii

Space for rough work

76. Given below are statements about the harmful effects of weeds on crop plants
- (i) They interfere in harvesting.
 - (ii) They help crop plants to grow healthily.
 - (iii) They compete with crop plants for water, nutrients, space and light.
 - (iv) They affect plant growth.
- Choose the correct combination of statements.
- (A) i, iii, iv (B) iii only (C) iii, iv (D) i, ii, iii, iv
77. The two micro-organisms which live in symbiotic association in lichens are
- (A) Fungus and Protozoa (B) Alga and Bacteria
(C) Bacteria and Protozoa (D) Alga and Fungus
78. The disease caused by a protozoan and spread by an insect is _____
- (A) Dengue (B) Malaria (C) Polio (D) Measles
79. Which of the following feature is correct for a wildlife sanctuary?
- (A) It is an artificially created protected area for animals.
(B) It is a protected area for threatened and endangered wild animals.
(C) It is meant for conservation of only plant species.
(D) Capturing and poaching of animals is allowed here.
80. Wild buffalo is an endangered species because
- (A) Its population is diminishing
(B) It has become extinct
(C) It is found exclusively in a particular area
(D) Its poaching is strictly prohibited

Space for rough work

PART-E : MENTAL ABILITY

DIRECTIONS (Q.No. 81) : In the following questions, select the related word/letters/numbers from the given alternatives.

81. Elated : Despondent :: Enlightened : ?

- (A) Aware (B) Tolerant (C) Ignorant (D) Miserable

DIRECTIONS (Q.Nos.82-83) : In the following questions, select the one which is different from other three alternatives.

82. (A) Cyclone (B) Famine (C) Flood (D) Earthquake

83. (A) 2401 (B) 149 (C) 49 (D) 343

84. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?

ab_b_cbacba_ba_cabcb

- (A) cbbb (B) bccb (C) acbc (D) caba

DIRECTIONS (Q.No. 85) : In the following questions, a series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.

85. 3, 11, 38, 102, 227, ?

- (A) 487 (B) 474 (C) 443 (D) 245

86. From the given alternative words, select the word which can be formed using the letters of the given word.

KNOWLEDGE

- (A) WONDER (B) WEALTH (C) FETCH (D) WEDGE

87. If in a certain code DICKINSON is written as 357950210 and DIPP is written as 3566, then how can PICNIC be written in the same code?

- (A) 657057 (B) 657507 (C) 560757 (D) 650757

Space for rough work

DIRECTIONS (Q.No. 88) : In the following questions, select the missing number from the given responses.

88.

6	11	25
8	6	16
12	5	?

(A) 12

(B) 16

(C) 18

(D) 22

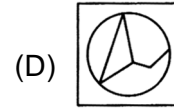
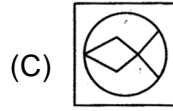
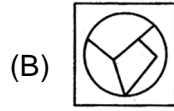
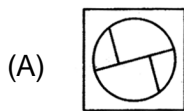
DIRECTIONS (Q.No. 89) : Among the four answer figures which can be formed from the cut out pieces given in question figure.

Question Fig.

89.



Answer Fig.



90. Ann, Bill and Ken shared some stamps in the ratio 2 : 3 : 4. After a game the ratio became 5 : 2 : 2. If Ann won 21 stamps how many did Ken lose ?

(A) 21

(B) 7

(C) 28

(D) 14

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.

91. USA : Congress :: Iran : ?

(A) Majlis

(B) Storting

(C) Althing

(D) Cortes

Space for rough work

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.

92. ABCD : WXYZ :: EFGH : ?

- (A) STOU (B) STUV (C) STUE (D) TSUV

93. If 1st half of the English alphabet is written in reverse order, then find the 15th letter from right.

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

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

94. 5, 16, 51, 158, ?

- (A) 452 (B) 481 (C) 483 (D) 454

DIRECTION : In the following question, one number is wrong in the series. Find out the wrong number.

95. 35, 118, 280, 600, 1238, 2504, 5036

- (A) 118 (B) 280 (C) 1238 (D) 600

DIRECTION : In each of 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 alternatives.

96. a __ ba __ bb __ ab __ a

- (A) aaba (B) baab (C) abab (D) baaa

97. ab __ aa __ aaa __ a __ ab __ a

- (A) abbab (B) abaaa (C) abbaa (D) aabba

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

98. Rajat correctly remembers that his mother's birthday is not after 18th of June. His sister correctly remembers that their mother's birthday is before 20th June but after 17th June. On which day in June was definitely their mother's birthday ?

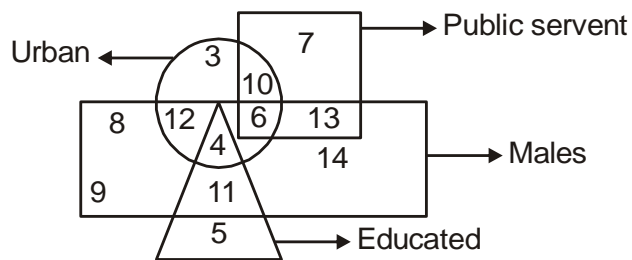
- (A) 17th (B) 18th (C) 19th (D) 17th or 18th

Space for rough work

99. Which of the following diagrams represents a relationship between Animals and Cows ?



DIRECTION (Q. No. 100) : Are based on the given diagram. Study the diagram carefully to answer the questions. In the diagram, rectangle represents males, triangle represents educated, square represents public servants and circle represents urban.



100. Out of following options, how many educated males are neither public servant nor urban ?

- (A) 10 (B) 4 (C) 9 (D) 11

Space for rough work

ANSWER - KEY

PART-A : PHYSICS

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

PART-B : CHEMISTRY

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

PART-C : MATHEMATICS

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

PART-D : BIOLOGY

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

PART-E : MENTAL ABILITY

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