

MENTORS EDUSERV

SCHOLASTIC APTITUDE TEST [ME-SAT]

SAMPLE TEST PAPER

[For Students going to Class 11 in 2021]
[STREAM: MEDICAL]

Time : 2 hours

Maximum Marks: 240

INSTRUCTIONS

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

[A] General

1. This Question paper contains **FOUR** Parts, **A to D** (Physics, Chemistry, Biology and Mental Ability).
2. This Question Paper contains **14 pages** including cover page.
3. This question paper contains total **100 questions** (**20** questions each in Physics, Chemistry & Mental Ability and **40** questions in Biology).
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. **Part A, Part B & Part D** : For each question you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY**. In all other cases, **minus one (-1) mark** will be awarded.
Part C (Biology) : For each question you will be awarded **1.5 marks** if you darken the bubble corresponding to the correct answer **ONLY**. In all other cases, **minus 0.5 mark** will be awarded.
Zero (0) marks if no bubble is darkened

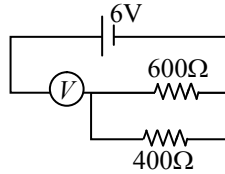
Name :

Registration No.:

SEAL

PART-A : PHYSICS

1. The measurement of voltmeter (ideal) in the following circuit is

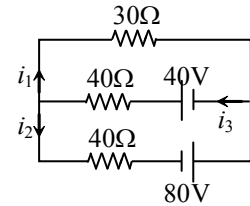


- (A) 2.4 V (B) zero (C) 4.0 V (D) 6.0 V
2. A current I is passing through a wire having two sections P and Q of uniform diameters d and $d/2$ respectively. If the mean drift velocity of electrons in section P and Q is denoted by v_P and v_Q respectively, then

- (A) $v_P = v_Q$ (B) $v_P = \frac{1}{2}v_Q$ (C) $v_P = \frac{1}{4}v_Q$ (D) $v_P = 2v_Q$

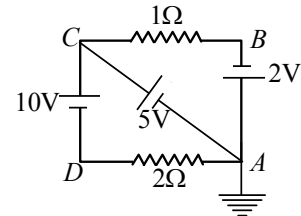
3. In the given circuit the current i_1 is

- (A) 0.4 A
(B) -0.4 A
(C) 0.8 A
(D) -0.8 A

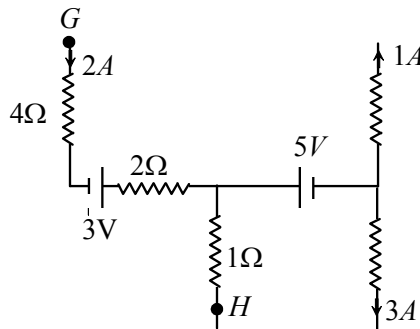


4. In the circuit shown in the figure, the ratio of V_B as to V_C is

- (A) -2/5
(B) -5/2
(C) 1
(D) 1/3



5. In the part of a circuit shown in the figure, the potential difference between points G and H ($V_G - V_H$) will be

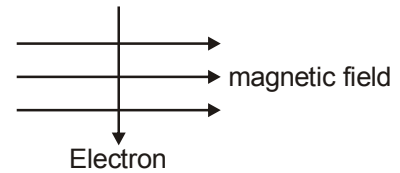


- (A) 0 V (B) 15 V (C) 7 V (D) 3 V

6. The filament of an electric heater should have
- (A) high resistivity and high melting point
(B) low resistivity and high melting point
(C) high resistivity and low melting point
(D) low resistivity and low melting point
7. When a long wire carrying a steady current is bent into a circular coil of one turn, the magnetic induction at its centre is B . When the same wire carrying the same current is bent to form a circular coil of n turns of a smaller radius, the magnetic induction at the centre will be
- (A) B/n (B) nB (C) B/n^2 (D) n^2B
8. A long solenoid has 200 turns per cm and carries a current i . The magnetic field at its centre is 6.28×10^{-2} Weber/m². Another long solenoid has 100 turns per cm and it carries a current $\frac{i}{3}$. The value of the magnetic field at its centre is
- (A) 1.05×10^{-4} Weber/m² (B) 1.05×10^{-2} Weber/m²
(C) 1.05×10^{-5} Weber/m² (D) 1.05×10^{-3} Weber/m²
9. Through two parallel wires A and B , 10 and 2 ampere of currents are passed respectively in opposite direction. If the wire A is infinitely long and the length of the wire B is 2 m, the force on the wire B , which is situated at 10 cm distance from A will be
- (A) 8×10^{-5} N (B) 4×10^{-7} N (C) 4×10^{-5} N (D) $4\pi \times 10^{-7}$ N
10. A solenoid of 1.5 metre length and 4.0 cm diameter possesses 10 turn per cm. A current of 5 ampere is flowing through it. The magnetic induction at axis inside the solenoid is
- (A) $2\pi \times 10^{-3}$ Tesla (B) $2\pi \times 10^{-5}$ Tesla
(C) $4\pi \times 10^{-2}$ Gauss (D) $2\pi \times 10^{-5}$ Gauss
11. A wire carrying current I and other carrying $2I$ in the same direction produces a magnetic field B at the mid point. What will be the field when $2I$ wire is switched off?
- (A) $B/2$ (B) $2B$ (C) B (D) $4B$

12. An electron enters a magnetic field at right angles to it, as shown in Figure. The direction of force acting on the electron will be

- (A) to the right
 (B) to the left.
 (C) out of the page
 (D) into the page.



13. Which of the following property of a proton can change while it moves freely in a magnetic field?

- (A) mass (B) speed (C) kinetic energy (D) momentum

14. A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R' , then the ratio R/R' is

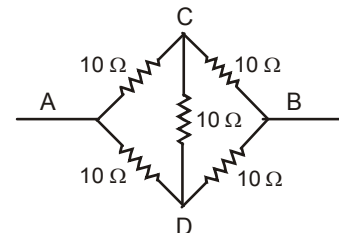
- (A) $1/25$ (B) $1/5$ (C) 5 (D) 25

15. An electric bulb is rated 220 V and 100 W . When it is operated on 110 V , the power consumed will be

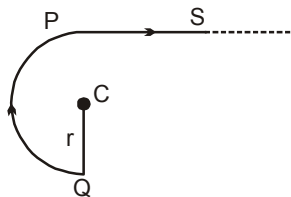
- (A) 100 W (B) 75 W (C) 50 W (D) 25 W

16. Find the equivalent resistance for the given network across AB

- (A) $10\ \Omega$
 (B) $15\ \Omega$
 (C) $20\ \Omega$
 (D) $25\ \Omega$

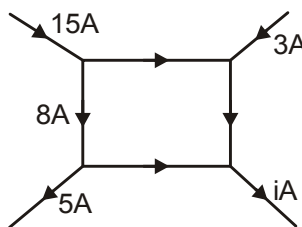


17. The magnetic field induction at the centre C of the arrangement shown in figure is



- (A) $\frac{\mu_0 i}{4\pi r}(1+\pi)$ (B) $\frac{\mu_0 i}{2\pi r}(1+\pi)$ (C) $\frac{\mu_0 i}{\pi r}(1+\pi)$ (D) $\frac{\mu_0 i}{r}(1+\pi)$

18. The number of turns in the coils is doubled without changing the length of the solenoid. The magnetic field at the centre of the solenoid will be :
- (A) doubled (B) halved (C) unchanged (D) none of these
19. Choose the incorrect statement.
- (A) Fleming's right-hand rule is a simple rule to know the direction of induced current
- (B) The right-hand thumb rule is used to find the direction of magnetic fields due to current carrying conductors
- (C) The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas the alternating current reverses its direction periodically
- (D) In India, the AC changes direction after every $\frac{1}{50}$ second
20. The value of current i in the circuit shown in the figure



- (A) 10A (B) 11A (C) 12A (D) 13A

PART-B : CHEMISTRY

21. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?
- (i) Displacement reaction (ii) Precipitation reaction
(iii) Combination reaction (iv) Double displacement reaction
(A) (i) only (B) (ii) only
(C) (iv) only (D) (ii) and (iv)
22. In the balanced equation a, b, c and d respectively are
- $$a\text{Fe}_2\text{O}_3 + b\text{H}_2 \rightarrow c\text{Fe} + d\text{H}_2\text{O}$$
- (A) 1, 1, 2, 3 (B) 1, 1, 1, 1 (C) 1, 3, 2, 3 (D) 1, 2, 2, 3
23. Which of the following statement is true?
- (A) The total mass of the substance remains same in chemical change.
(B) Chemical change is permanent and irreversible.
(C) Physical change is temporary and reversible.
(D) All of these.
24. Plaster of Paris hardens by
- (A) giving off CO_2 (B) changing into CaCO_3
(C) combining with water (D) giving out water
25. Bleaching powder gives smell of chlorine because it
- (A) is unstable
(B) gives chlorine on exposure to atmosphere
(C) is a mixture of chlorine and slaked lime
(D) contains excess of chlorine
26. Which out of the following has smell similar to that of vinegar ?
- (A) Methanol (B) Ethanol (C) Ethanoic acid (D) Formic acid
27. Which gas is passed through dry slaked lime to produce bleaching powder?
- (A) H_2 (B) O_2 (C) Cl_2 (D) N_2
28. Ferrous sulphate on heating produces
- (A) ferric oxide (B) carbon dioxide (C) oxygen (D) water
29. Aluminium is more reactive than iron. But aluminium is less easily corroded than iron because
- (A) aluminium is a noble metal
(B) oxygen forms a protective oxide layer
(C) iron undergoes reaction easily with water
(D) iron forms mono and divalent ions

30. Acids like lactic acid, uric acid which are obtained usually from plants and animals
(A) organic acid (B) inorganic acid (C) oxyacid (D) hydra acid
31. Choose one example of inorganic acid (mineral acid) from the following.
(A) Oxalic acid (B) Acetic acid (C) Nitric acid (D) Formic acid
32. Which of the following statements is true regarding acids and bases?
(A) Acids and bases don't react with each other
(B) Acids mixed with bases neutralise each other
(C) Acids mixed with bases make stronger acids
(D) Acids mixed with bases make weaker acids
33. Which gas is evolved when acids react with metal carbonates?
(A) CO_2 (B) H_2 (C) NH_3 (D) H_2O_2
34. Which acid is used in flavoured drinks?
(A) Boric acid (B) Carbonic acid (C) Sulphuric acid (D) Oxalic acid
35. Sour milk contains
(A) lactic acid (B) acetic acid (C) tartaric acid (D) citric acid
36. Which of the following statements is correct? Rusting of iron is a chemical change because
(A) a new substance with new properties is produced
(B) chemical composition of reactant is changed
(C) change is permanent and can not be reversed easily
(D) all of these
37. Acetic acid is a weak acid because
(A) its aqueous solution is acidic (B) it is highly ionized
(C) it is weakly ionized (D) it contains – COOH group
38. A solution turns blue litmus red. The pH of the solution is probably
(A) 8 (B) 10 (C) 12 (D) 6
39. Iron nails were dipped in solution kept in a test tube. After half an hour, it was observed that the colour of the solution has changed. The solution present in, the test tube was that of
(A) zinc sulphate (B) copper sulphate
(C) iron sulphate (D) aluminium sulphate
40. In the balanced equation $\text{Cu} + x\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + y\text{NO}_2 + 2\text{H}_2\text{O}$
The values of x and y are
(A) 3 and 5 (B) 8 and 6 (C) 4 and 2 (D) 7 and 1

PART-C : BIOLOGY

41. Transpiration mainly occurs through
(A) Stomata, about 70-80% of water is evaporated through stomata
(B) Lenticels, about 70-80% of water is evaporated through Lenticels
(C) Stomata, about 80-90% of water is evaporated through stomata
(D) Cuticular, about 80-90% of water is evaporated through cuticle
42. Which force help in upward movement of water or sap from root to leaves.
(A) Cohesion force (B) Transpiration pull
(C) Gravitational pull (D) More than one option is correct
43. Water will be abosorbed by root hair when
(A) Concentration of solutes in the cell sap is high
(B) Plant is rapidly respiring
(C) They are separated from soil by a permeable membrane
(D) Concentration of salts in the soil is high through a semi-permeable membrane.
44. Main type of chlorophyll present in plant is
(A) Chlorophyll a (B) Chlorophyll b (C) Chlorophyll c (D) Chlorophyll d
45. Photolysis of water takes place in
(A) Photosystem I (B) Photosystem II (C) Mitochondria (D) None
46. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in
(A) Cytoplasm (B) Chloroplast (C) Mitochondria (D) Nucleus
47. Which of the following plant hormones is essential for cell division ?
(A) Auxin (B) Gibberellin (C) Ethylene (D) Cytokinin
48. Name the plant hormone responsible for falling of senescent leaves.
(A) Gibberellin (B) Auxin (C) Cytokinin (D) Abscisic acid
49. Read the given paragraph.
Photosynthesis in plants consists of two phases : X and Y. Phase X requires light enegy and occurs in granum of chloroplast whereas phase Y is light independent and occurs in stroma of chloroplast.
Which of the following holds true regarding phases X and Y of photosynthesis ?
(A) In phase X, light energy is used up in photolysis of water and molecular oxygen is evolved.
(B) In phase Y, electrons and protons are used up in synthesis of assimilatory power.
(C) Assimilatory power generated in phase Y is used up in phase X to convert CO₂ into carbohydrates.
(D) Phase X utilises carbon dioxide gas of atmosphere whereas phase Y evolves oxygen gas that escapes into atmosphere.

50. Triple response caused by
(A) Auxin (B) Ethylene (C) Cytokinin (D) All
51. Name the plant hormone which is termed growth inhibitor.
(A) Auxin (B) Gibberellin (C) Abscisic acid (D) Ethylene
52. Richmond lang effect is shown by
(A) Cytokinin (B) Auxin (C) Both (D) None
53. Phototropism in plants is due to
(A) Unequal distribution of auxins
(B) Uniform occurrence of gibberellins
(C) Inhibition of cytokinin synthesis
(D) Unequal distribution of cytokinins and gibberelins
54. **Assertion** : Auxin are found in the growing tips of the plant.
Reason : The concentration of auxin is highest at the tip of the root.
(A) Assertion and reason, both are true. (B) Assertion is true, Reason is false
(C) Assertion and reason both are false (D) Only reason is true.
55. Photosynthesis is
(A) Metabolic process (B) Anabolic process
(C) Catabolic process (D) All
56. Krebs cycle occurs in
(A) Matrix of mitochondria (B) Matrix of chloroplast
(C) Both (D) Lumen of thylakoids
57. End product of glycolysis is
(A) Acetyl CoA (B) Pyruvic acid
(C) Both, depends on condition (D) None
58. Chlorophyll activates on exposure to
(A) Water (B) Light (C) Soil (D) CO₂
59. "Light reaction" in photosynthesis occurs in
(A) Grana (B) Stroma (C) Matrix (D) None

60. Girdling experiment were performed in which -
(A) Ring of bark is removed from woody plant (B) It interrupt phloem
(C) It interrupt xylem movement (D) More than one option is correct.
61. Which of the following is not the function of kidney ?
(A) Ultrafiltration (B) Reabsorption (C) Secretion (D) Urea formation
62. In human which of the following is completely reabsorbed by Nephrons ?
(a) Glucose (b) Protein (c) Water (d) Sodium
(A) a, b, c & d (B) a and c (C) a and b (D) Only c
63. Brunner's gland are present in -
(A) Mucosa of duodenum (B) Submucosa of duodenum
(C) Mucosa of Jejunum (D) Submucosa of ileum
64. Broadest part of large intestine is :-
(A) Caecum (B) Appendix (C) Ascending colon (D) Descending colon
65. Drum stick shape nucleus is the characteristic of -
(A) Erythrocyte (B) Monocyte (C) Eosinophill (D) Neutrophill
66. One cardiac cycle takes how much time ?
(A) 0.2 sec (B) 0.4 sec (C) 0.6 sec (D) 0.8 sec.
67. Value of stroke volume is :-
(A) 60 ml (B) 70 ml (C) 80 ml (D) 90 ml
68. Value of G.F.P. is -
(A) 10 mm Hg (B) 20 mm Hg (C) 30 mm Hg (D) 40 mm Hg
69. Value of G.F.R. is -
(A) 105 ml/min (B) 115 ml/min (C) 125 ml/min (D) 135 ml/min
70. How much urea releases per day ?
(A) 10-15 gm (B) 15-20 gm (C) 20-25 gm (D) 25-30 gm
71. Lymphatic vessel present in villi which is essential for absorption of fat is called :-
(A) Lacteal (B) Rennin (C) Interstitium (D) Magnum

72. F.R.C. is represented by ?
(A) T.V. + E.R.V. (B) E.R.V. + R.V.
(C) E.R.V. – R.V. (D) V.C. – I.R.V.
73. Covering of lung is called
(A) Glisson capsule (B) Pericardium
(C) Pleura (D) All
74. First step of photosynthesis is :-
(A) Excitation of chlorophyll (B) Dark reaction
(C) Formation of ATP (D) Evolution of O₂
75. Which one acts as an anti-transpirant ?
(A) Cytokinine (B) Auxin (C) Gibberellin (D) A.B.A.
76. End product of alcoholic fermentation is : -
(A) CO₂ + lactic acid (B) Ethanol + CO₂
(C) Ethanol + CO₂ + ATP (D) Lactic acid + ATP
77. Which group is present in chlorophyll-A :-
(A) Aldehyde (B) Alcoholic (C) Methyl (D) Ketone
78. Hearing centre is located in which part of brain ?
(A) Frontal lobe (B) Parietal lobe
(C) Occipital lobe (D) Temporal lobe
79. Lateral fissure divides the :-
(A) Parietal and temporal (B) Frontal and parietal
(C) Frontal and occipital (D) Parietal and occipital
80. Diencephalon is the part of which brain ?
(A) Mid brain (B) Fore brain (C) Hind brain (D) Spinal cord

PART-D : 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. Sheep : Flock :: Fish : _____ ?

- (A) Mob (B) Chorus (C) Shoal (D) Stock

82. Whale : Mammal :: Rat : _____ ?

- (A) Rodent (B) Reptile (C) Insect (D) Amphibian

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. CFIL : ABCD :: ? : WXYZ

- (A) YBEH (B) YBHE (C) BYEH (D) YBHH

84. 8 : 28 :: 15 : ?

- (A) 75 (B) 63 (C) 65 (D) 71

85. If 2nd half of the English alphabet is written in reverse order, then find the 19th letter from right.

- (A) W (B) U (C) V (D) S

86. If in a certain code language 'ree ra de' means 'what was it', 'mo nil' means 'you go', 'nil pom ra' means 'you like it' and 'took lee to' means 'she was sick' then how will you write 'what you like' in that language ?

- (A) de nil pom (B) pom nil ra (C) nil ra lee (D) None of these

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

87. 6, 11, 23, 45, _____ ?

- (A) 95 (B) 91 (C) 98 (D) 97

88. 7, 22, 69, 212, _____ ?

- (A) 652 (B) 673 (C) 643 (D) 645

89. 77, 49, 36, 18, _____ ?

- (A) 18 (B) 16 (C) 11 (D) 8

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

90. XYZ, ABC, UVW, DEF, RST, GHI, ?

- (A) UVW (B) JKL (C) OPQ (D) NOP

91. CIG, FLJ, IOM, ?

- (A) LRP (B) JLG (C) PSU (D) QUB

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.

92. a __ ba __ bb __ ab __ a

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

93. ab __ aa __ aaa __ a __ ab __ a

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

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.

94. 7 9 36

5 6 03

4 ? 02

- (A) 8 (B) 3 (C) 5 (D) 2

95. Dev correctly remembers that his mother's birthday is not after 21th of March. His sister correctly remembers that their mother's birthday is before 23th March but after 20th March. On which day in June was definitely their mother's birthday ?

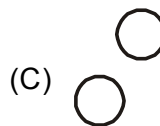
- (A) 23rd (B) 22nd (C) 21th (D) 21th or 22th

96. If A means '+', B means '-', C means '×' and D means \div , then

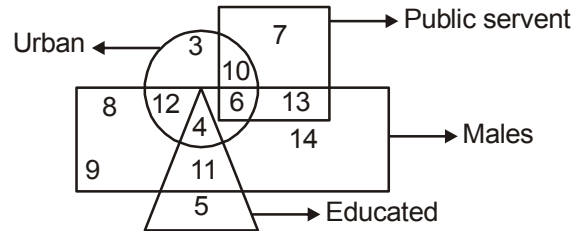
16 C 32 D 8 A 5 B 15 = ?

- (A) 54 (B) 38 (C) 88 (D) 58

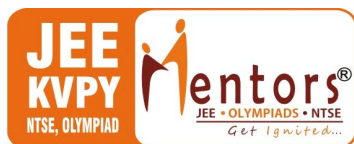
97. Which of the following diagrams represents a relationship between Spinach and vegetable ?



DIRECTION : 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.



98. Out of following options, how many educated males are neither public servant nor urban ?
 (A) 10 (B) 4 (C) 11 (D) 9
99. Out of the following options, how many persons are urban who are public servants not educated or males ?
 (A) 3 (B) 5 (C) 6 (D) 10
100. Out of the following options, how many persons are both educated males and urban?
 (A) 4 (B) 2 (C) 5 (D) 11



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PHYSICS

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

CHEMISTRY

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

BIOLOGY

- | | | | | |
|---------|---------|---------|---------|---------|
| 41. (C) | 42. (D) | 43. (A) | 44. (A) | 45. (B) |
| 46. (C) | 47. (D) | 48. (D) | 49. (A) | 50. (B) |
| 51. (C) | 52. (A) | 53. (A) | 54. (A) | 55. (B) |
| 56. (A) | 57. (B) | 58. (B) | 59. (A) | 60. (D) |
| 61. (D) | 62. (C) | 63. (B) | 64. (A) | 65. (D) |
| 66. (D) | 67. (B) | 68. (A) | 69. (C) | 70. (D) |
| 71. (A) | 72. (B) | 73. (C) | 74. (A) | 75. (D) |
| 76. (C) | 77. (C) | 78. (D) | 79. (A) | 80. (B) |

MENTAL ABILITY

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