



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

[For Students presently in Class 10 going to Class 11 in 2020]
(Stream: Medical)

Time : 2 hours

Maximum Marks: 240

INSTRUCTIONS

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

SEAL

[A] General

1. This Question paper contains **FOUR** Parts, **A to D** (Physics, Chemistry, Biology and Mental Ability).
2. This Question Paper contains **19 pages**.
3. This question paper contains total **100 questions** (20 questions each in Physics, Chemistry, Mental Ability + 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:

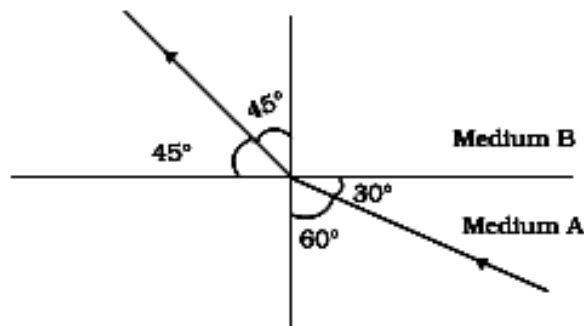
11. **Part A, Part B & Part D** : For each question you will be awarded **3 marks** if you darken the bubble corresponding to the correct answer **ONLY**. In all other cases, **minus one (-1) mark** will be awarded.
Part C (Biology) : For each question you will be awarded **1.5 marks** if you darken 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.:

PART-A : PHYSICS

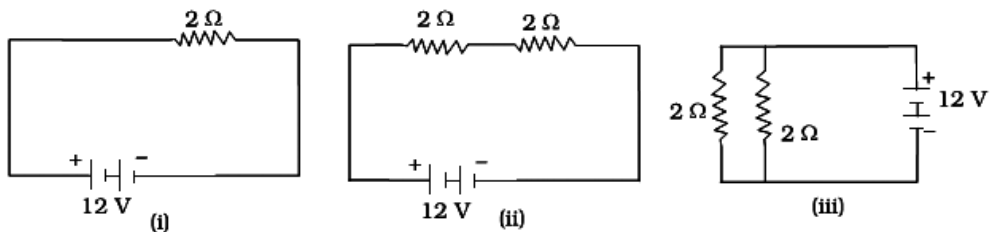
1. Where should an object be placed in front of a convex lens to get a real image of the size of the object?
- (A) At the principal focus of the lens
(B) At twice the focal length
(C) At infinity
(D) Between the optical centre of the lens and its principal focus.
2. Figure below shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is



- (A) $\sqrt{3}/\sqrt{2}$ (B) $\sqrt{2}/\sqrt{3}$ (C) $1/\sqrt{2}$ (D) $\sqrt{2}$
3. A child is standing in front of a magic mirror. She finds the image of her head bigger, the middle portion of her body of the same size and that of the legs smaller. The following is the order of combinations for the magic mirror from the top.
- (A) Plane, convex and concave (B) Convex, concave and plane
(C) Concave, plane and convex (D) Convex, plane and concave

Space for rough work

4. At noon the sun appears white as
- (A) light is least scattered
 - (B) all the colours of the white light are scattered away
 - (C) blue colour is scattered the most
 - (D) red colour is scattered the most
5. In the following circuits (Figure), heat produced in the resistor or combination of resistors connected to a 12 V battery will be



- (A) same in all the cases
 - (B) minimum in case (i)
 - (C) maximum in case (ii)
 - (D) maximum in case (iii)
6. In an electrical circuit three incandescent bulbs A, B and C of rating 40 W, 60 W and 100 W respectively are connected in parallel to an electric source. Which of the following is likely to happen regarding their brightness?
- (A) Brightness of all the bulbs will be the same
 - (B) Brightness of bulb A will be the maximum
 - (C) Brightness of bulb B will be more than that of A
 - (D) Brightness of bulb C will be less than that of B

Space for rough work

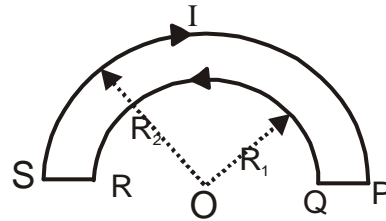
7. For a current in a long straight solenoid N- and S-poles are created at the two ends. Among the following statements, the incorrect statement is
- (A) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
 - (B) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
 - (C) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
 - (D) The N- and S-poles exchange position when the direction of current through the solenoid is reversed.
8. 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
9. The phenomenon of electromagnetic induction is
- (A) the process of charging a body.
 - (B) the process of generating magnetic field due to a 'current passing through a coil.
 - (C) producing induced current in a coil due to relative motion between a magnet and the coil.
 - (D) the process of rotating a coil of an electric motor.
10. At the time of short circuit, the current in the circuit
- (A) reduces substantially (B) does not change
(C) increases heavily. (D) vary continuously

Space for rough work

11. The combination responsible for admitting different amounts of light into the eye is
(A) ciliary muscles and crystalline lens (B) ciliary muscles and pupil
(C) iris and pupil (D) rods and cones
12. Consider the following statements:
A. In series connection, the same current flows through each element.
B. In parallel connection, the same potential difference gets applied across each element.
(A) both A and B are correct (B) A is correct but B is wrong
(C) A is wrong but B is correct (D) both A and B are wrong
13. A commutator changes the direction of current in the coil of
(A) a DC motor
(B) a DC motor and an AC generator
(C) a DC motor and a DC generator
(D) an AC generator
14. A wire of resistance 10.0 ohm is stretched so as to increase its length by 20%. Its resistance then would be
(A) 10.0 ohm (B) 20.0 ohm (C) 14.4 ohm (D) 10.2 ohm
15. The masses of three wires of copper are in the ratio 1 : 3 : 5 and their lengths are in the ratio 5 : 3 : 1. The ratio of their electrical resistances is
(A) 1 : 3 : 5 (B) 5 : 3 : 1
(C) 1 : 15 : 125 (D) 125 : 15 : 1

Space for rough work

16. The wire loop PQRSP formed by joining two semicircular wires of radii R_1 and R_2 carries a current I as shown in the figure. The magnitude of the magnetic induction at the centre 'O' is



- (A) $\frac{\mu_0 I}{2} \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$ (B) $\frac{\mu_0 I}{4} \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$ (C) $\frac{\mu_0 I}{4} \left[\frac{1}{R_2} - \frac{1}{R_1} \right]$ (D) $\frac{\mu_0 I}{2} \left[\frac{1}{R_2} - \frac{1}{R_1} \right]$
17. The critical angle of a light going from medium A into medium B is θ . The speed of light in medium A is V . The speed of light in medium B is
- (A) $\frac{V}{\sin \theta}$ (B) $V \sin \theta$ (C) $\frac{V}{\tan \theta}$ (D) $V \tan \theta$
18. An instrument based on the principle of Total internal reflection of the light is:
- (A) Optical Fiber (B) Galvanometer (C) Telescope (D) Microscope
19. The force on a charged particle 'q' which is kept at rest in a uniform magnetic field 'B' is
- (A) zero (B) qvB (C) $qvB \sin \theta$ (D) $qvB \cos \theta$
20. An AC generator is connected to an electric appliance. In 10 revolutions of the armature, the current in the appliance changes direction
- (A) 5 times (B) 10 times (C) 20 times (D) 40 times

Space for rough work

PART-B : CHEMISTRY

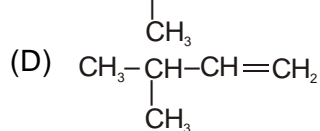
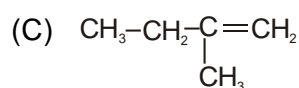
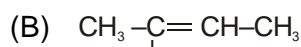
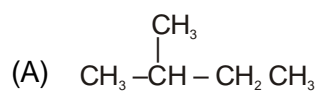
21. In the following equations :
 $\text{Na}_2\text{CO}_3 + x\text{HCl} \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$, the value of x is
(A) 1 (B) 2 (C) 3 (D) 4
22. Combination of phosphorus and oxygen is an example of
(A) oxidation (B) reduction (C) rancidity (D) none of these
23. Which of the following statements is not true for the chemical equation ?
 $2\text{N}_2\text{O}_5 \rightarrow 4\text{NO}_2 + \text{O}_2$
(A) 2 mol of N_2O_5 on dissociation gives 4 mol of NO_2 and 1 mol of O_2 .
(B) 1 mol of N_2O_5 on dissociation gives 2 mol of NO_2 and 0.5 mol of O_2 .
(C) 2 g of N_2O_5 on dissociation gives 4g of NO_2 and 1 g of O_2 .
(D) 216 g of N_2O_5 on dissociation gives 184 g of NO_2 and 32 g mol of O_2 .
24. The species among the following, which can act as an acid and a base is
(A) HSO_4^- (B) SO_4^{2-} (C) H_3O^+ (D) Cl^-
25. Which of the following does not give H^+ ions in aqueous solution?
(A) H_2CO_3 (B) $\text{C}_2\text{H}_5\text{OH}$ (C) CH_3COOH (D) H_3PO_4
26. pH is a measure ofions in a solution.
(A) hydrogen (B) hydroxide (C) ammonium (D) carbonium
27. Which of the following is an oxide ore?
(A) Bauxite (B) Cuprite (C) Haematite (D) All of these

Space for rough work

28. Zone refining process is used for the
(A) concentration of an ore (B) reduction of a metal oxide
(C) purification of metal (D) purification of an ore
29. Metal always found in free state is
(A) gold (B) silver (C) copper (D) sodium
30. The process of heating an ore in limited air and below its melting point is called
(A) smelting (B) roasting (C) calcination (D) pyrolysis
31. Which is true about electronegativity order?
(A) $P > Si$ (B) $C > N$ (C) $Br > Cl$ (D) $Sr > Ca$
32. The correct order of electron affinity among the following is
(A) $F > Cl > Br$ (B) $Br > Cl > F$ (C) $Cl > F > Br$ (D) $F > Br > Cl$
33. The most basic oxide is
(A) Na_2O (B) Al_2O_3 (C) SO_2 (D) NO_2
34. Which of the following oxides is amphoteric in nature?
(A) CaO (B) CO_2 (C) SiO_2 (D) SnO_2
35. All the members in a group of a long form of periodic table have the same
(A) valency (B) number of valence electrons
(C) chemical properties (D) all of the above
36. Aliphatic compounds essentially contain
(A) an aromatic ring
(B) a non-aromatic ring
(C) a ring containing an atom other than carbon
(D) no ring at all

Space for rough work

37. 2-methyl but-2-ene will be represented as



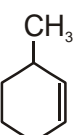
38. Which of the following is not a saturated hydrocarbon?

(A) Cyclohexane

(B) Benzene

(C) Butane

(D) Isobutane

39. The IUPAC name of  is

(A) 3 - methyl cyclohexene

(B) 1 - methyl cyclohex-2-ene

(C) 6-methyl cyclohexene

(D) 1-methyl cyclohex-5-ene

40. Methane, ethane and propane are said to form a homologous series because all are –

(A) hydrocarbons

(B) saturated hydrocarbons

(C) aliphatic hydrocarbons

(D) differ from each other by – CH_2 group

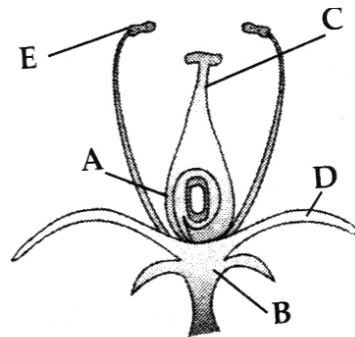
Space for rough work

PART-C : BIOLOGY

41. Instrument used to measure blood pressure is
- (A) Haemocytometer (B) Haemometer
(C) Sphygmomanometer (D) Stethoscope
42. Which of the following receives oxygenated blood from the lungs?
- (A) Right atrium (B) Left atrium (C) Right ventricle (D) Left ventricle
43. Glucose gets converted into pyruvate in
- (A) Mitochondria (B) Muscle cells (C) Cytoplasm (D) Yeast
44. Name the plant hormone which is termed growth inhibitor
- (A) Auxin (B) Gibberellin (C) Abscisic acid (D) Ethylene
45. Which part of human brain is more developed in comparison to others?
- (A) Cerebrum (B) Cerebellum (C) Optic lobes (D) Medulla oblongata
46. Which of the following is not an involuntary action?
- (A) Vomiting (B) Peristalsis (C) Heart beat (D) Chewing
47. Master gland in the body is
- (A) Thyroid (B) Adrenal
(C) Islets of Langerhans (D) Pituitary
48. Name the part of nervous system which is generally involved in reflex actions
- (A) Brain (B) Ganglion (C) Pons (D) Spinal cord

Space for rough work

49. Which of the following is not a part of the female reproductive system in human beings ?
 (A) Ovary (B) Uterus (C) Vas deferens (D) Fallopian tube
50. Fruit is formed from
 (A) Stamen (B) Stigma (C) Ovary (D) Ovule
51. Which of the following is a contraceptive device ?
 (A) Copper-T (B) Condom (C) Diaphragm (D) All of these
52. The opening at the base of the ovule is called
 (A) Micropyle (B) Stigma (C) Placenta (D) Style
53. Match the labelled parts of the given figure with the correct option



A	B	C	D	E
(A) Ovary	Thalamus	Filament	Sepal	Anther
(B) Ovary	Thalamus	Style	Sepal	Anther
(C) Ovary	Sepal	Style	Thalamus	Filament
(D) Ovary	Sepal	Style	Thalamus	Stamen

Space for rough work

54. An example of homologous organs is
(A) Our arm and a dog's fore leg (B) Our teeth and an elephant's tusks
(C) Potato and runners of grass (D) All of the above
55. Allele that cannot express itself in presence of another is
(A) Codominant (B) Dominant (C) Recessive (D) Complementary
56. A segment of DNA providing information for a protein is called
(A) Nucleus (B) Chromosomes (C) Trait (D) Gene
57. Which plant hormone plays a role in apical dominance in plants?
(A) Auxin (B) Absciscic acid (C) Ethylene (D) Gibberellin
58. Which of the following is the correct sequence regarding sexual reproduction in a flowering plant?
(A) Pollination, Fertilization, Seedling, Embryo
(B) Seedling, Embryo, Fertilization, Pollination
(C) Pollination, Fertilization, Embryo, Seedling
(D) Embryo, Seedling, Pollination, Fertilization
59. What is the surgical method of contraception used in human males?
(A) Vasectomy (B) Condoms
(C) Contraceptive pills (D) Tubectomy
60. Which of the following diseases is transmitted sexually?
(A) Sleeping sickness (B) Jaundice
(C) Elephantiasis (D) Syphilis

Space for rough work

61. Which of the following is not an advantage of vegetative propagation ?
- (A) Plants which produce non viable seeds can be grown
 - (B) It is a easier method than sowing seeds
 - (C) Such plants produce seeds and fruits much earlier than plants produced from other methods
 - (D) It is the best method to introduce new genetic traits in the species
62. Which of the following is not the function of the seminal vesicles present in human males ?
- (A) To store the sperms in a fluid medium
 - (B) To provide nutrition to developing spermatozoa
 - (C) To make transport of sperms easier
 - (D) None of the above
63. Mendel crossed a pure recessive white flowered pea plant with a pure dominant red flowered plant. The first generation of hybrids from the cross should show
- (A) 50% white flowers and 50% red flowers
 - (B) All red flowered plants
 - (C) 75% red flowered and 25% white flowered plants
 - (D) All white flowered plants
64. Why were pea plants more suitable than dogs for Mendel's experiments?
- (A) There were no pedigree records of dogs
 - (B) Pea plants can be self-fertilized
 - (C) All pea plants have only two chromosomes
 - (D) Dogs have many genetic traits

Space for rough work

65. Law of independent assortment can be proved on the basis of which of the following ratios?
(A) 1 : 3 : 1 (B) 2 : 1 : 1 (C) 9 : 3 : 3 : 1 (D) 2 : 1
66. Which one of the following is not one of the direct conclusions that can be drawn from Mendel's experiment?
(A) Only one parental trait is expressed
(B) Two copies of each trait is inherited in sexually reproducing organism
(C) For recessive trait to be expressed, both copies should be identical
(D) Natural selection can alter frequency of an inherited trait
67. If a heterozygous tall plant is crossed with a homozygous dwarf plant, the proportion of dwarf progeny will be
(A) 50% (B) 75% (C) 100% (D) 25%
68. Which of the following is not true for a species?
(A) Member of species can interbreed
(B) Variations can occur among members of a species
(C) Each species is reproductively isolated from every other species
(D) Gene flow does not occur between the populations of a species
69. All mammals, whale, dolphin, bat, monkey and horse have some important common characters, but they also show conspicuous differences. This is due to the phenomenon of
(A) Normalisation (B) Genetic drift (C) Convergence (D) Divergence
70. In his experiments, Mendel did not come across linkage, because
(A) He studied only pea plants
(B) He did not have a powerful microscope
(C) Characters he studied were located on different chromosome pairs
(D) There were too many chromosomes involved

Space for rough work

71. Twins absolutely resembling each other in sex and external appearance result when :
- (A) Two similar sperms fertilise two similar eggs
(B) Same sperm fertilises two eggs
(C) Two halves of the same egg develop separately after it is fertilised by one sperm
(D) Two halves of the same egg are fertilised by two separate sperms
72. Which of the following tests is for determining, the sex of the foetus ?
- (A) Blood group test (B) Amniocentesis (C) Blood sugar test (D) pH value test
73. Life originated :
- (A) In water (B) On land (C) In air (D) In all of these
74. Evolution of man is believed to have taken place in :
- (A) Central America (B) Africa (C) Asia (D) Australia
75. How many molecules of O_2 can associate with a molecule of haemoglobin in man ?
- (A) One (B) Two (C) Three (D) Four
76. Heart beat originates from :-
- (A) Left atrium (B) Right ventricle (C) Pacemaker (D) Cardiac muscles
77. Urine leaves the kidney through :-
- (A) Urethra (B) Collecting duct (C) Renal vein (D) Ureter
78. The white matter in a bird's dropping is :-
- (A) Calcium carbonate (B) Calcium sulphate
(C) Uric acid (D) Urea

Space for rough work

79. HCl of gastric juice is produced by
 (A) Chief cells (B) Oxyntic cells (C) Goblet cells (D) Columnar cells
80. Which of the following organs are not directly connected to each other?
 (A) Oesophagus-stomach (B) Buccal cavity-stomach
 (C) Colon-rectum (D) Stomach-duodenum

PART-D : MENTAL ABILITY

81. If Development is written as Tnemdevelop, then Evaluation will be written as
 (A) Notiaevalu (B) Noitaulave (C) Notievalua (D) Noitevalua

DIRECTIONS (Q. Nos. 82-83) : From the given alternative words, select the word which cannot be formed using the letters of the given word.

82. UNCONTAMINATED

- (A) MINE (B) NATON (C) CONNOTE (D) TANDEM

83. DEPARTMENT

- (A) ENTER (B) PARENT (C) TEMPER (D) PARADE

84. If '+' means 'x', '-' means '÷', '÷' means '+' and 'x' means '-', then what will be the value of $16 \div 64 - 4 \times 4 + 3 = ?$

- (A) 20 (B) 52 (C) 15 (D) 12

DIRECTIONS (Q. No. 85) : Select the missing number from the given responses.

85.

6	5	4
7	6	5
5	7	6
37	23	?

- (A) 14 (B) 10 (C) 12 (D) 13

Space for rough work

DIRECTIONS (Q. Nos. 86-87) : Find the odd number/letters/ number pair from the given alternatives.

86. (A) AZBY (B) CXDW (C) EVFU (D) TGSH
 87. (A) 12 – 144 (B) 13 – 156 (C) 15 – 180 (D) 16 – 176

DIRECTIONS : (88) Select the missing number from the given responses.

88.

6	8	7
36	64	49
24	48	35
18	24	?

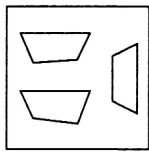
- (A) 17 (B) 18 (C) 19 (D) 21

DIRECTIONS (Q. No. 89) : Find out the wrong number in the series.

89. 27, 81, 1331, 125
 (A) 125 (B) 27 (C) 1331 (D) 81

DIRECTIONS : In which among the answer figures can be constructed from the parts given in question figure?

90. **Question Figure**



Answer figure

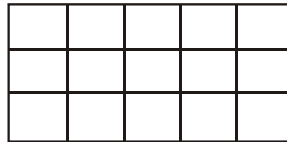
- (A) (B) (C) (D)

Space for rough work

91. Ravi travelled 4 km straight towards South. He turned left and travelled 6 km straight, then turned right and travelled 4 km straight. How far is he from the starting point?

- (A) 8 km (B) 10 km (C) 12 km (D) 18 km

92. How many squares are there in the following figure ?



- (A) 24 (B) 25 (C) 26 (D) 27

93.

4	$\frac{1}{5}$	$\frac{21}{5}$
1	$\frac{1}{2}$	$\frac{3}{2}$
2	?	$\frac{8}{3}$

- (A) $\frac{5}{4}$ (B) $\frac{3}{4}$ (C) $\frac{2}{3}$ (D) $\frac{1}{2}$

94.

64	25 31 36	144	9	324 38 169	16	36	64 ? 361	576
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- (A) 115 (B) 82 (C) 135 (D) 57

95. A student got twice as many sums wrong as he got right. If he attempted 48 sums in all, how many did he solve correctly ?

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

Space for rough work

96. In an examination, a student scores 4 marks for every correct answer and loses 1 mark for every wrong answer. If he attempts all 75 questions and secures 125 marks, the total number of questions he attempted correctly, is :

- (A) 35 (B) 40 (C) 42 (D) 46

DIRECTIONS 97) : A cube is painted red on two adjacent surfaces and black on the surfaces opposite to red surfaces and green on the remaining faces. Now the cube is cut into sixty four smaller cubes of equal size.

97. How many smaller cubes will have no surface painted ?

- (A) 0 (B) 4 (C) 8 (D) 16

DIRECTIONS 98–99 : Correct the following equations by interchanging the two signs :

98. $3 - 9 \times 27 + 9 \div 3 = 3$

- (A) + and – (B) x and + (C) x and \div (D) x and –

99. $5 \times 15 \div 7 - 20 + 4 = 77$

- (A) – and + (B) x and \div (C) + and \div (D) + and x

DIRECTIONS 100) : Correct the following equations by interchanging the two signs :

100. $4 \times 2 + 6 \div 2 - 12 = 2$

- (A) \div and x (B) + and – (C) x and + (D) \div and –

Space for rough work

ANSWER - KEY

PART- A : PHYSICS

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

PART- B : CHEMISTRY

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

PART- C : BIOLOGY

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

PART- D : MENTAL ABILITY

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