# MSAT – 2025

**(MAHARISHI SCHOLARSHIP CUM ADMISSION TEST)**

## Class – 09th going to 10th

***SAMPLE PAPER***

**FIITJEE**
CHENNAI CENTRE

**Disclaimer: This is a sample paper provided for practice purposes only. The level of difficulty, type of questions, and total number of questions may vary in the actual examination.**

Time: 3 Hour | Maximum Marks: 155

**General Instructions:**

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the examination hall before the end of test.
- Do not keep the OMR sheet exposed to others.
- Shade the correct answers only in the OMR sheet given. Do not write or mark answers or symbols (Like ✓, •, X ...) anywhere in the questions paper.
- This booklet is your Question Paper.
- This Question Paper booklet contains 5 Sections. All Section contains Part A.

| Section | Subject | Types of Questions | Number of Questions | Marking Scheme |
|---|---|---|---|---|
| I | MAT | Single Answer Questions | 20 | +1,0 |
| II | MATHS | Single Answer Questions | 15 | +3,-1 |
| III | PHYSICS | Single Answer Questions | 10 | +3,-1 |
| IV | CHEMISTRY | Single Answer Questions | 10 | +3,-1 |
| V | BIOLOGY | Single Answer Questions | 10 | +3,-1 |

==========

## USEFUL DATA

### PHYSICS

| | |
|---|---|
| Acceleration due to gravity | : g = 10 m/s$^2$ |
| Planck constant | : h = 6.6 × 10$^{-34}$ $J-s$ |
| Charge of electron | : e = 1.6 × 10$^{-19}$ $C$ |
| Mass of electron | : $m_e = 9.1\times10^{-31}\ kg$ |
| Permittivity of free space | : $\varepsilon_0 = 8.85\times10^{-12}\ C^2/N-m^2$ |
| Density of water | : $\rho_{water} = 10^3\ kg/m^3$ |
| Atmospheric pressure | : $Pa = 10^5\ N/m^2$ |
| Gas constant | : R = 8.314 J $K^{-1}\ mol^{-1}$ |

### CHEMISTRY

| | | |
|---|---|---|
| Gas Constant | R = | 8.314 J $K^{-1}mol^{-1}$ |
| | = | 0.0821 Lit atm $K^{-1}mol^{-1}$ |
| | = | 1.987 ≈2 Cal $K^{-1}mol^{-1}$ |
| Avogadro's Number $N_a$ | = | 6.023 × 10$^{23}$ |
| Planck's constant h | = | 6.625 ×10$^{-34}$ $J.s$ |
| | = | 6.625×10$^{-27}$ $erg.s$ |
| 1 Faraday | = | 96500 coulomb |
| 1 calorie | = | 4.2 joule |
| 1 amu | = | 1.66 ×10$^{-27}$ $kg$ |
| 1 $eV$ | = | 1.6×10$^{-19}$ $J$ |

Atomic No: H = 1, He = 2, Li = 3, Be = 4, B = 5, C = 6, N = 7, O = 8, F = 9, Ne = 10, Na = 11, Mg = 12, Si = 14, Al = 13, P = 15, S = 16, Cl = 17, Ar = 18, K = 19, Ca = 20, Cr = 24, Mn = 25, Fe = 26, Co = 27, Ni = 28, Cu = 29, Zn = 30, As = 33, Br = 35, Ag = 47, Sn = 50, I = 53, Xe = 54, Ba = 56, Pb = 82, U = 92.

Atomic masses: H = 1, He = 4, Li = 7, Be = 9, B = 11, C = 12, N = 14, O = 16, F = 19, Na = 23, Mg = 24, Si = 28, Al = 27, P = 31, S = 32, Cl = 35.5, K = 39, Ca = 40, Cr = 52, Mn = 55, Fe = 56, Co= 59, Ni = 58.7, Cu = 63.5, Zn = 65.4, As = 75, Br = 80, Ag = 108, Sn = 118.7, I = 127, Xe = 131, Ba = 137, Pb = 207, U = 238.

**Name** : _____

**Registration Number** : _____

# MAT Section – I

**Part – A**
**Single Answer Questions**

1. How many such pairs of letters are there in the word INSTRUCTION which have as many letters between them in the word as in the English alphabet?
(A) One (B) Two (C) Three (D) Four

2. If the first three letters of the word COMPREHENSION are reversed, then the last three letters are added and then the remaining letters are reversed and added, then which letter will be exactly in the middle?
(A) H (B) N (C) R (D) S

**Direction (Q.No.3 - 5): Each of the following questions is based on the following alphabet series.**
**A B C D E F G H I J K L M N O P Q R S T U V W X Y Z**

3. Which letter is midway between the eighteenth letter from the left end and tenth letter from the right end of the given alphabet?
(A) No letter (B) K (C) Q (D) R

4. Which letter is sixteenth to the right of the letter which is fourth to the left of I?
(A) S (B) T (C) U (D) V

5. Which letter will be sixth to the left of the nineteenth letter from the right end of the alphabet?
(A) M (B) N (C) X (D) B

6. A man walks 10 km towards North. From there he walks 6 km towards South. Then he walks 3 km towards East. How far and in which direction is he with reference to his starting point?
(A) 7 km East (B) 5 km West (C) 5 km North-East (D) 7 km West

7. If North-West becomes South, South-West becomes East and so on, what will West become?
(A) North (B) North-East (C) South (D) South-East

8. Laxman went 15 km to the West from his house, then turned left and walked 20 km. Then, he turned East and covered 25 km Finally, turning left, he covered 20 km. How far was he from his house?
(A) 5 km (B) 10 km (C) 40 km (D) 80 km

9. If in a certain language, SHIFT is coded as RFFBO. Which word would be coded as LKUMB?
(A) MMXQG (B) MLVNC (C) KJVLA (D) MJVLC

10. If in a certain code, ALMIRAH is written as BNPMWGO, which word would be coded as DNRWLUA?
(A) COSGOLT (B) TOGSOLC (C) TOGCLOS (D) CLOSGOT

11. If in a certain code, EQUATION is written as OPJUBVRF, which word would be code of REPUTATION?
(A) NOITATUPER (B) OPJTBUVQFS (C) OPJUBUVQFS (D) OPJUBTVQFS

12. If the word EARTH is written as QPMZS in coded form, how can HEART be written following the same coding?
(A) SQPZM (B) SQMPZ (C) SPQZM (D) SQPMZ

13. If 'ROOM' is called 'BED', 'BED' is called 'WINDOW', 'WINDOW' is called 'FLOWER' and 'FLOWER' is called 'COOLER', on what would a man sleep?
(A) WINDOW (B) BED (C) FLOWER (D) COOLER

14. If 'AIR' is called 'GREEN', 'GREEN' is called 'BLUE', 'BLUE' is called 'SKY', 'SKY' is called 'YELLOW', 'YELLOW' is called 'WATER' and 'WATER' is called 'PINK', then what is the colour of clear sky?
(A) BLUE (B) SKY (C) YELLOW (D) WATER

15. A and B can do a piece of work in 18 days; B and C can do it in 24 days; A and C can do it in 36 days. In how many days can they do it all working together?
(A) 12 (B) 13 (C) 16 (D) 26

16. A man complete a job in four days working ten hours a day. In how many days can he complete it if he works eight hours a day?
(A) 5 (B) 10 (C) 2.5 (D) 4

17. Tap A can fill an empty tank in six hours. Tap B can fill it in nine hours. Find the time taken (in hours) if the two taps are opened together to fill the tank (in hours).
(A) 2.7 (B) 3.6 (C) 4.8 (D) 2.4

18. Find the length of the bridge, which a train 120 m long travelling at 54 kmph can cross in 30 seconds.
(A) 340 m (B) 350 m (C) 330 m (D) 390 m

19. Find the time taken by a train 150 m long running at a speed of 63 kmph to cross another train of length 100 m long running at a speed of 45 kmph in the same direction
(A) 25 seconds (B) 50 seconds (C) 75 seconds (D) 100 seconds

20. A train 120 m long crosses a standing man in 15 seconds.The speed of the train is
(A) 32 km/hr (B) 36.5 km/hr (C) 28.8 km/hr (D) 40 km/hr

# MATHS Section – II

**Part – A**
**Single Answer Questions**

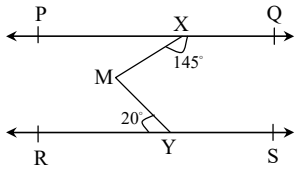
1. Express $0.\overline{24}+0.3\overline{4}$ as a single decimal
(A) $0.57\overline{88}$ (B) $0.68\overline{9}$ (C) $0.688\overline{7}$ (D) $0.58\overline{68}$

2. If $2x-1$ is a factor of the polynomial $81x^3-45x^2-3a-6$, then a is _____
(A) $\frac{8}{3}$ (B) $\frac{-19}{8}$ (C) $\frac{-10}{8}$ (D) $\frac{11}{3}$

3. If $x=\frac{2}{\sqrt{3}-\sqrt{5}}$ *and* $y=\frac{2}{\sqrt{3}+\sqrt{5}}$ *then* $x+y=$ _____
(A) $-2\sqrt{5}$ (B) $-2\sqrt{3}$ (C) $2\sqrt{3}$ (D) $2\sqrt{5}$

4. $\left[\{(\frac{1}{7^2})^{-2}\}^{\frac{-1}{3}}\right]^{\frac{1}{4}}=x^m$, then m = ____
(A) $\frac{-1}{3}$ (B) $-\frac{1}{4}$ (C) -3 (D) 2

5. In figure, If $PQ \parallel RS$, $\angle MXQ=145^\circ$ and $\angle MYR=20^\circ$, find $\angle XMY$.
(A) $40^0$ (B) $55^0$
(C) $165^0$ (D) $140^0$




6. The supplement of an angle is one-third of itself. Determine the angle
(A) $40^0$ (B) $110^0$ (C) $135^0$ (D) $45^0$

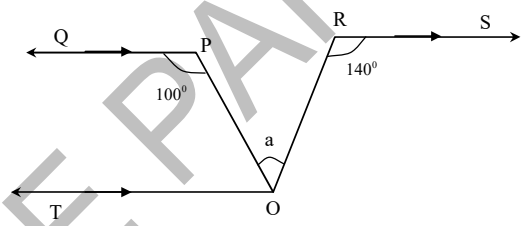
7. Find the square root of $\frac{m^{n^2}n^{m^2}a^{(m+n)}}{(m+n)^{(m+n)^2}}$

(A) $m^n n^m a^{\frac{m+n}{2}}$ (B) $\frac{m^{\frac{n^2}{2}}n^{\frac{m^2}{2}}a^{\frac{m+n}{2}}}{(m+n)^{\frac{(m+n)^2}{2}}}$ (C) $\frac{m^n n^m a^{\sqrt{m+n}}}{(m+n)^{(m+n)}}$ (D) None of these

8. If a-b = 3 and $a^3 - b^3 = 117$ then a+b is
(A) 5 (B) 6 (C) 7 (D) 8

9. The remainder when $x^{45}$ is divided by $x^2 - 1$ is
(A) $2x$ (B) $-x$ (C) 0 (D) $x$

10. In the given figure, $\angle a =$
(A) $60^0$ (B) $70^0$
(C) $65^0$ (D) $85^0$




11. The G.C.D of the polynomial $18(x^3 - 9x^2 + 8x)$ and $24(x^2 - 3x + 2)$ is
(A) $6(x-1)$ (B) $6(x+1)$ (C) $6(x^2-1)$ (D) $6(x^2+1)$

12. If $x^{100} + 2x^{99} + k$ is divisible by *(x + 1)*, then the value of *k* is
(A) 1 (B) – 3 (C) 2 (D) – 2

13. Which of the following is a factor of $(x^2 + 4 + 9z^2 + 4x - 6xz - 12z)$
(A) $(x + 2 - 3z)$ (B) $(x - 2 + 3z)$ (C) $(x + 2 + 3z)$ (D) $(x - 2 - 3z)$

14. The remainder when $x^{100} + 1$ is divided by $x^2 - 1$ is _____
(A) x (B) 2x **(C) 2** (D) 100

15. The degree of the zero polynomial is
(A) 0 (B) n (C) ∞ (D) not defined

# PHYSICS Section – III

**Part – A**
**Single Answer Questions**

1. An athlete completes one fourth a round of a circular track of radius R, then the displacement and distance covered by the athlete are
(A) R $\sqrt{}$2 and πR/2 (B) $\pi R$ and $2R$ (C) $R$ and $2\pi R$ (D) $2\pi R$ and $R$

2. A particle experience a constant acceleration for 20 sec. after starting from rest. If it travels a distance $S_1$ in the first 10 sec. and a distance $S_2$ in the next 10 sec, then
(A) $S_1 = S_2$ (B) $S_1 = \frac{S_2}{3}$ (C) $S_2 = \frac{S_1}{3}$ (D) $S_1 = \frac{S_2}{4}$

3. A body released from the top of a tower of height 'h'. It takes 'T' seconds to reach the ground. Its position in $\frac{T}{3}$ seconds is

(A) $\frac{h}{9}$ from the ground (B) $\frac{7h}{9}$ from the ground

(C) $\frac{8h}{9}$ from the ground (D) $\frac{17h}{18}$ from the ground

4. If a bus starts form rest and moves with acceleration 2 m/s$^2$ for 5 seconds and then moves with constant velocity for another 5 seconds then displacement of bus during entire journey

(A) 45 m (B) 50 m (C) 75 m (D) 60 m

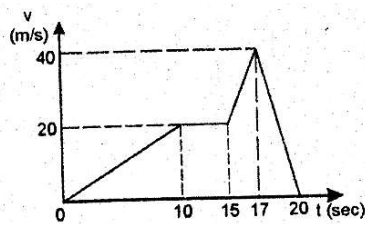
5. A stone thrown vertically upwards with an initial velocity u from the top of tower, reaches the ground with a velocity 3u. The height of the tower is:

(A) $3u^2/g$ (B) $4u^2/g$ (C) $6u^2/g$ (D) $9u^2/g$

6. A ball of mass $m_1$ & another ball of mass $2m_1$ are dropped from equal height. If time taken by the balls is $t_1$ & $t_2$ respectively then:

(A) $t_1 = t_2$ (B) $t_1 = 2t_2$ (C) $t_1 = 4t_2$ (D) $2t_1 = t_2$

7. The velocity versus time curve of a moving point is as shown in the figure. The magnitude of maximum acceleration is




(A) $1\,m/s^2$ (B) $2\,m/s^2$

(C) $10\,m/s^2$ (D) $40/3\ m/s^2$

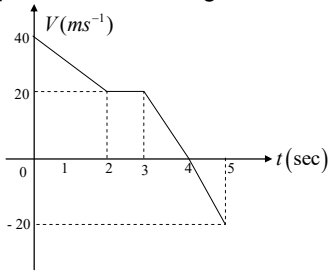
8. A bullet is fired on a wall with a velocity of 100 m/s. If the bullet stops at a depth of 10 cm inside the wall, then find the retardation produced by the wall:

(A) $20\ km/s^2$ (B) $50\ km/s^2$ (C) $100\ km/s^2$ (D) $200\ km/s^2$

9. If a body is thrown with a velocity of 19.6 m/s, making an angle 30$^0$ with the horizontal, then the time of flight is (take $g = 9.8 m/s^2$)

(A) 1 s (B) 2s (C) 2√3 s (D) 5 s

10. The motion of a body is depicted in the v-t graph shown to the right. Refer to the graph.




Average velocity of the body in 5 sec is

(A) 4 m/s (B) 10 m/s (C) 16 m/s (D) 20 m/s

# CHEMISTRY Section – IV

**Part – A**
**Single Answer Questions**

1. Which among the following is not a crystalline solid?
(A) Graphite (B) NaCl (C) Iodine (D) Glass

2. Super energetic particles present in
(A)Solids (B) Liquids (C) Plasma (D) Gases

3. Low density of gases is due to
(A) Weak forces of attraction between molecules (B) Less inter particle spaces between molecules
(C) Random movement of molecules (D) Collision of molecules

4. Which of the following varies greatly with rise in temperature?
(A) Density of solid (B) Volume of gas
(C) Pressure of a liquid (D) Compressibility of a solid

5. Which of the following is the correct relation:
(A) $P_1V_2 = P_2V_1$ (B) $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ (C) $\frac{P_1T_2}{V_2} = \frac{P_2T_1}{V_1}$ (D) $P_1T_1 = P_2T_2$

6. Which pair of gases diffuse with the same rate at the same temperature and pressure
(A) CO ,NO (B) $N_2O$,$CO_2$ (C) NO, $C_2H_4$ (D) $NH_3$,$PH_3$

7. The property of compressibility is
(A) Maximum in solids (B) Least in solids (C) Maximum in liquids (D) Least in gases

8. Which of the following does not undergo sublimation:
(A) Camphor (B) Ammonium sulphate
(C) Iodine (D) Dry ice

9. Under which of the following values, do Celsius and Fahrenheit scale read the same?
(A) -100 (B) -73 (C) -40 (D) -27

10. A gas can be liquefied on
(A) Increasing Pressure (B) Increasing Temperature
(C) Decreasing Temperature (D) Increasing pressure and decreasing temperature

# BIOLOGY Section – IV

**Part – A**
**Single Answer Questions**

1. Which of the following are example of undifferentiated cells
(A) Zygote (B) Blastomeres
(C) Bone marrow cells (D) All of the above

2. Which is NOT a characteristic feature of prokaryotic cell
(A) DNA is circular (B) Cell is a single membrane system
(C) Nucleolus is present (D) No membrane bound organelles

3. The following is a characteristic of eukaryotic cell
(A) No nucleus (B) No double membraned organelles
(C) 50s Ribosomes are present (D) Cytoplasm shows streaming movement

4. The animal cell consist of _____ for cell division which is absent in plants
   (A) Lysosomes (B) Vacuoles (C) Centrioles (D) All the above

5. Middle lamella is a jelly like substance made up of
   (A) Manganese pectate (B) Potassium pectate (C) Calcium pectate (D) Sodium pectate

6. Cell wall of the fungi is made up of
   (A) Chitin (B) Hemi-Cellulose (C) Pectin (D) Cutin

7. Cell organelles that are associated with removal of toxic substances is/are:
   (A) Smooth endoplasmic reticulum only (B) Rough endoplasmic reticulum
   (C) Smooth endoplasmic reticulum and peroxisomes (D) Mitochondria

8. Nuclear membrane is also called
   (A) Karyolemma (B) Nucleoplasm (C) Nucleolus (D) All of the above

9. Recombination or Crossing over occurs in meiosis I during
   (A) Zygotene (B) Pachytene (C) Diplotene (D) Diakinesis

10. In cell cycle G0 phase is also called as
   (A) Interphase (B) Quiescent phase
   (C) Metabolically inactive phase (D) None of the above

## Answer key - Class - 09

### MAT

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

### MATHS

| | | | | |
|---|---|---|---|---|
| 1.D | 2.B | 3.B | 4.A | 5.B |
| 6.C | 7.B | 8.C | 9.D | 10.A |
| 11.A | 12.A | 13.A | 14.C | 15.D |

### PHYSICS

| | | | | |
|---|---|---|---|---|
| 1.A | 2.C | 3.C | 4.C | 5.B |
| 6.A | 7.C | 8.B | 9.B | 10.C |

### CHEMISTRY

| | | | | |
|---|---|---|---|---|
| 1. D | 2.C | 3.A | 4.B | 5.B |
| 6.B | 7.B | 8.B | 9.C | 10.D |

### BIOLOGY

| | | | | |
|---|---|---|---|---|
| 1.D | 2.C | 3.D | 4.C | 5.C |
| 6.A | 7.C | 8.A | 9.B | 10.B |