FIITJEE

MAHARASHTRA SCIENCE TALENT SEARCH EXAMINATION

for students of Class IX

Time: 3 Hours   **Maximum Marks: 270**

➢ **Please read the instructions carefully. You are allotted 5minutes specifically for this purpose.**

➢ **You are not allowed to leave the examination hall before end of the test**.

INSTRUCTIONS

Note:

- The question paper contains 3 Parts

- **PART – 1** contains 25 questions of **IQ**

- **PART – 2** contains1-7 questions of **Physics ,** 8-14 questions of **Chemistry** and 15-20 questions of **Biology.**

- **PART – 3** contains 30 questions of **Mathematics**

- All are multiple choice questions. Each question has four choices (A), (B), (C) and (D), out of which only one is correct.

Marking Scheme:

- For each question, in all the three parts, you will be awarded **3 marks** if you have darkened only the bubble corresponding to the correct answer, **zero marks** for not darkening any bubble and in all other cases **minus one (-1) mark** will be awarded.

Name of the Candidate :   _____

Test Centre   :   _____

PART – I: IQ

SECTION A   **Single Correct Choice Type**

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

Directions (Q. 1 to 2) : In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

1.   2, 7, 17, 32, 52, ?
   (A) 51   (B) 57
   (C) 77   (D) 67

2.   0, 7, 26, ?, 124, 215
   (A) 88   (B) 53
   (C) 44   (D) 63

Directions (Q. 3 to 4) : In each of the following questions, one term in the number series is wrong. Find out the wrong term.

3.   3, 7,13, 21, 32, 43, 57,73.
   (A) 13   (B) 32
   (C) 43   (D) 73

4.   1,2,4,7,11,16,22,29,37,47.
   (A) 1   (B) 11
   (C) 29   (D) 47

Directions (Q. 5 to 6) : In each of the following questions, various terms of an alphabet series are given with one or more terms missing as shown by (?). Choose the missing terms out of the given alternatives.

5.   Z,Y, W ,V ,T ,S ,Q ,P,?, ?
   (A) M,N   (B) O,N
   (C) N,O   (D) N,M

6.   A,B,A,C,D,C,?, ? ,? ,G,H,G,I,J,I,K,L,K
   (A) D,E,D   (B) E,F,E
   (C) F,G,F   (D)   D,E,F

7.   Find the term which does not fit into the series :
       3ZA, 5YB, 9XC, 11WD, 13VE, 17UF
   (A) 5YB   (B) 9XC
   (C) 11WD   (D) 17UF

Directions (Q. 8 to 10) : 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. Choose the correct alternative.

8.   a b b _ c c a _ d a e e a _ f a g _ _ i i
   (A) a d f g a   (B) a d a g a
   (C) c d f g a   (D) a d f g i

9.   m p _ s a s p m m p a s _ s p m m p a s _ s p m m p a s _ s p m
   (A) as m a   (B) a a a a
   (C) p a s a   (D) a a s s

10.   a b 1 _ c 2 c d _ d e 4 e f 5 _ g 6 g h _ h i 8 i j 9 j _ 10 k / 11 / m 12
   (A) a3ff9   (B) b3f7k
   (C) b3f5f   (D) b3f7j

11.   In a certain code ROAD is written as URDG. How is SWAN written in that code?
   (A) VXDQ   (B) VZDQ
   (C) UXDQ   (D) VZCO

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12. If C=3 , J =10,X=24 and RAT=39,then what is the number value of MOUSE ?
(A) 63   (B) 77
(C) 75   (D) 73

13. In a certain code MENTION is written as LNEITNO. How is PATTERN written in that code?
(A) APTTREN   (B) PTAETNR
(C) OTAETNR   (D) OTAETRN

14. If in a certain language CARROM is coded as BZQQNL, which word will be coded as HOUSE?
(A) IPVTF   (B) GNTRD
(C) INVRF   (D) GPTID

15. If PAINT is coded as 74128 and EXCEL is coded as 93596, then how would you decode ACCEPT ?
(A) 455978   (B) 547978
(C) 554978   (D) 735961

16. In a certain code language ," 479" means ' fruit is sweet' ; "248" means ' very sweet voice'; and "637" means ' eat fruit daily' . Which digit stands for "is" in that code?
(A) 7   (B) 9
(C) 4   (D) can't be determined

17. If ' sti nro kti ' stands for " clouds pour down" ; ' nro bsi mit ' stands for " down he goes " and 'bsi nro zpi ' stands for " died down he " , which word would mean " goes" ?
(A) nro   (B) mit
(C) kti   (D) bsi

Directions (Q. 18 to 21) Study the following figure carefully and answer the questions given below it. The rectangle represents 'Artists ',the circle represents 'Players' and the triangle represents 'Doctors'
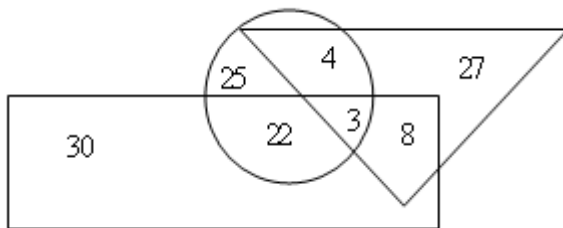

18. How many players are neither artists nor doctors?
(A) 3   (B) 8
(C) 22   (D) 25

19. How many Artists are players?
(A) 30   (B) 29
(C) 25   (D) 22

20. How many doctors are both players and Artists ?
(A) 3   (B) 4
(C) 8   (D) 11

21. How many doctors are neither players nor artists?
(A) 30   (B) 27
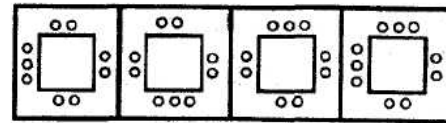(C) 22   (D) 8
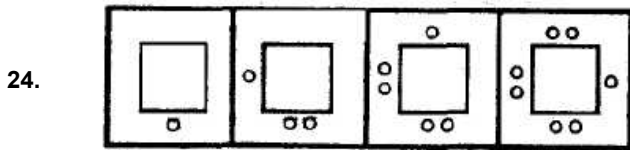
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Directions (For Q. 22 – 25): All the four figures in the set of problem figures bear a definite sequence discover that sequence and pickup one figure from the answer figures that completes the series. Mark your answers as (a), (b), (c) or (d).
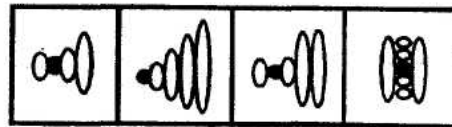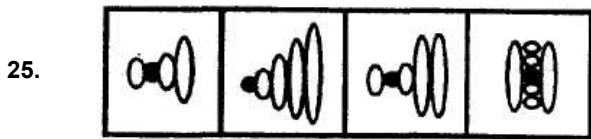
22.

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

23.

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

24.

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

25.
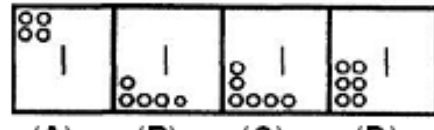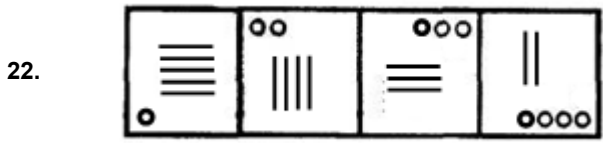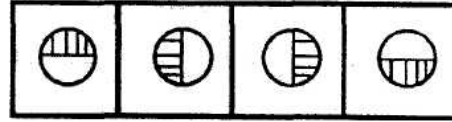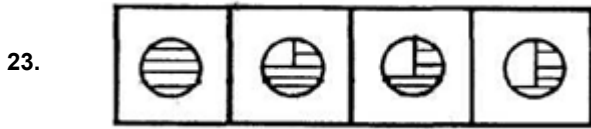
(A)   (B)   (C)   (D)

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PART – II: Science

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

26. A car moves on a straight road with constant acceleration. It's speed is observed to increase from 36 km/hr to 90km/hr while covering a distance of 262.5 m. The time taken by the car to cover this distance is
    (A) 15 s   (B) 6 s
    (C) 4.17 s   (D) 1.35 s

27. A body with volume V and specific gravity 3 is floating in a liquid with specific gravity 13.6. The whole system is at rest. The volume of body outside the liquid is

    (A) $\dfrac{3V}{13.6}$ (B) $\dfrac{10.6V}{16.6}$

    (C) $\dfrac{53V}{68}$ (D) $\dfrac{34V}{49}$

28. In a cricket game, Virat hits a ball moving with 100 miles/hr, head on, sending it off his bat in the exact opposite direction at 75 miles/hr. The actual contact between ball and bat lasted for 17.5 milliseconds. Mass of ball = 160g. The force with which he hit the ball was (Given: 1.00 mi/hr = 0.447 m/s)
    (A) 1600 N   (B) 715.2 N
    (C) 160 N   (D) 71.52 N

34. In an Indian village a woman wishes to draw water from a well using a light rope and a bucket of mass 3 kg. The capacity of bucket is 7 liters. If she pulls the completely filled bucket with an acceleration of 1.2 m/s^2, the forced applied by her on the rope will be
    (density of water = 1000kg/m^3)
    (A) 98 N   (B) 100 N
    (C) 110 N   (D) 120 N

35. A boy is running along the circumference of a circular playground of radius $\dfrac{1750}{11}$ m . He completes one round trip

    in 500 s and stops. His average velocity is
    (A) 4 m/s   (B) 2 m/s
    (C) 1 m/s   (D) 0 m/s

36. A solid spherical ball is thrown in a lake. It is observed that is moves with a constant velocity towards the bottom of the lake, then
    (A) the density of the ball must be greater than that of water.
    (B) the density of the ball must be equal to that of water.
    (C) the density of the ball must be less than that of water.
    (D) nothing can be said about densities if the velocity is not known.

37. A ship is sinking. When it is at depth 550m and has velocity 5m/s, a body of relative density 0.5 gets detached from it. The time in which this body will reach the surface of water is
    (A) 9.5s   (B) 11s
    (C) 13.8s   (D) 15.8s

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| SECTION B | CHEMISTRY |

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

44. An ion with mass number 27 contains 3 units of positive charge and 40 % more neutrons than electrons. Assign symbol to the ion.
(A) B^{3+}
(B) Al^{3+}
(C) Fe^{3+}
(D) Co^{3+}

45. Which of the following statements are correct?
(A) 0.25 moles of water occupies 5.6 liter at S.T.P.
(B) 1.6 g of oxygen contains approximately 3×10^{22} Molecules of oxygen
(C) 7 g of nitrogen occupies 11.2 litre at S.T.P
(D) 10 ml acetic acid (CH_3COOH) contains one mole of oxygen atoms (assume density of acetic acid is 1.5 g/cc)

Match the columns.

46.

	Column A		Column B
(P)	Spread sweet odour into the atmosphere	(1)	Condensation
(Q)	A gas changing into a liquid	(2)	Diffusion
(R)	Change of solid state to liquid state	(3)	Vaporisation
(S)	Change of liquid state to gaseous state	(4)	Sublimation
(T)	Change from solid to vapour directly	(5)	Fusion

	P	Q	R	S	T
(A)	1	2	5	4	3
(B)	2	5	3	1	4
(C)	2	1	5	3	4
(D)	3	1	2	5	4

47. Which of the following is not a compound?
(A) Common salt
(B) Water
(C) Iron fillings
(D) Copper sulphate

48. Which one represents a system of constant composition irrespective of the change of temperature?
(A) True solution
(B) Colloid
(C) Compound
(D) All of these

49. The sulphate of an element M has the formula $M_2(SO_4)_3$ .The formula of its phosphate will be
(A) MPO_4
(B) $M_2(PO_4)_3$
(C) M_3PO_4
(D) $M_3(PO_4)_2$

50. An atom of an element has two electrons in the M shell, what is the symbol of element?
(A) He
(B) Be
(C) Mg
(D) Ca

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SECTION C	BIOLOGY

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

51. Basic unit or smallest unit of classification in taxonomy is _____
(A) Species   (B) Kingdom
(C) Family   (D) Variety

52. Cell wall shows
(A) Complete permeability   (B) Semi-permeability
(C) Differential – Permeability   (D) Impermeability

53. An outer covering membrane is absent in
(A) Lysosome   (B) Plastid
(C) Nucleus   (D) Ribosome

60. Which of the following is a pair of viral diseases?
(A) Cholera, AIDS   (B) Cholera, Typhoid
(C) Common cold, AIDS   (D) Typhoid, Common Cold

61. Ringworm disease is caused by a pathogen that is also a member of Kingdom
(A) Protista   (B) Fungi
(C) Monera   (D) Animalia

62.
(A)   (B)
(C)   (D)

53.
(A)   (B)
(C)   (D)

54.
(A)   (B)
(C)   (D)

55.
(A)   (B)
(C)   (D)

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PART – III: Mathematics

SECTION A   **Single Correct Choice Type**

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

61. $|x| = 5$ then x is equal to
(A)   0
(B)   10
(C)   – 5
(D)   None

62. $|x-1| + |x+2| = 5$ then x is equal to
(A)   x = 2
(B)   x = - 4
(C)   x = - 2
(D)   x = 3

63. If $x^2 - 1$ is a factor of $ax^4 + bx^3 + cx^2 + dx + e$, then
(A)   a + c + e = 1
(B)   a + b + c = 0
(C)   b + d = 0
(D)   a + e = 0

64. If x,y,z are the roots of the equation $t^3 - 3t - 2 = 0$ then $x^3 + y^3 + z^3 - 3xyz$ is equal to
(A)   1
(B)   – 4
(C)   3
(D)   none of these

65. Chose the correct option
(A) $\log_3 4 > \log_3(4.5)$
(B) $\log_2 0.2 < \log_3 0.1$
(C) $\log_{0.2} 25 < \log_{0.2} 20$
(D) $\log_2 0.25 < \log_2 0.1$

66. $\dfrac{\log_a m}{\log_a n}$ is equal to

(A)   1
(B) $\log_a\left(\dfrac{m}{n}\right)$

(C) $\dfrac{\log_a n}{\log_a m}$
(D) $\dfrac{\log_n a}{\log_m a}$

67. If ABC is a triangle in which $\angle A = 72°$, the internal bisectors of angles B and C meet at O, then $\angle BOC =$
(A)   136°
(B)   126°
(C)   116°
(D)   106°

68. The complement of two-fifth of a right angle is
(A)   54°
(B)   56°
(C)   66°
(D)   16°

69. The side BC, CA and AB of a triangle ABC are produced in order, forming exterior angles $\angle ACD$, $\angle BAE$, $\angle CBF$ then $\angle ACD + \angle BAE + \angle CBF = ?$
(A)   330°
(B)   360°
(C)   300°
(D)   345°

70. If X is a point on the line AB, Y and Z are points outside such that $\angle AXY = 45°$ and $\angle YXZ = 150°$, then $\angle AXZ = ?$
(A)   165°
(B)   105°
(C)   110°
(D)   100°

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Paragraph 1:

Let x be a real number, and let $A = \dfrac{-1+3x}{1+x} - \dfrac{\sqrt{|x|-2}+\sqrt{2-|x|}}{|2-x|}$

71. The value of A=
   (A) 6   (B) 1
   (C) -1   (D) 7

72. The quadratic equation whose roots are unit digit's of A^{2012} and unit digit's of A^{2003} is
   (A) $x^2 - 4x + 3 = 0$ (B) $x^2 - 5x + 6 = 0$
   (C) $x^2 - 3x + 2 = 0$ (D) $x^2 - 8x + 7 = 0$

Paragraph 2:

Consider $a_1 x + b_1 y + c_1 = 0$ & $a_2 x + b_2 y + c_2 = 0$

Above system of linear equations have infinite solution if $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2}$

73. If $\dfrac{x}{3} + \dfrac{y}{2} = 1$ and $\dfrac{x}{6} - \dfrac{y}{k} = \dfrac{1}{2}$ having infinite solution then K =?
   (A) 4   (B) -4
   (C) 1   (D) -1

74. If $(K-3)x + 3y - K = 0$, $Kx + Ky - 12 = 0$ having infinite solution, then K = ?
   (A) -6   (B) 6
   (C) 16   (D) None

Paragraph 3:

A can complete a piece of work in p days and B can complete it in q days, then A and B together can complete the same in $\dfrac{pq}{p+q}$ days

75. If 20 men take 30 days to complete a job, in how many days can 25 men complete the job
   (A) 23   (B) 24
   (C) 25   (D) 26

76. A and B together can do a piece of work in 12 days B and C can do it in 15 days and C and A can do it in 20 days. How long would B take to complete the job.
   (A) 40   (B) 20
   (C) 15   (D) 25

77. A triangle and a rectangle have the same base 13cm and the same area. If the other two sides of the triangle are 20cm and 11cm then the length of other side of the rectangle is
   (A) $\dfrac{64}{11}$ (B) $\dfrac{66}{11}$
   (C) $\dfrac{64}{13}$ (D) $\dfrac{66}{13}$

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78. How many spherical lead shots each 4.2cm in diameter can be obtained from a rectangular solid lead with dimensions 66cm, 42cm and 21cm?
(A) 500   (B) 1000
(C) 1500   (D) 2000

79. If $\overline{X}$ is the mean of n-observations $x_1, x_2, \_\_\_\_\_, x_n$, then $\sum\limits_{i=1}^{n}(x_i - \overline{X}) =$

(A) 0   (B) n

(C) varies according to data   (D) $\overline{X}$

80. For any event 'A' associated to an experiment, if P(A) represents its probability, then
(A) $0 > P(A) < 1$ (B) $0 \le P(A) < 1$
(C) $0 \le P(A) 1$ (D) $0 \le P(A) \le 1$

81. If the ratio of radii and height of two cylinders be 2:1 each, then ratio of their volumes is
(A) 1:2   (B) 2:1
(C) 8:1   (D) 1:8

82. The number of circular pipes with an inside diameter of 1cm which will carry the same amount of water as a pipe with an inside diameter of 6cm is (given both pipes have same length)
(A) 6π (B) 6
(C) 12   (D) 36

83. The mean of first n-natural numbers is
(A) $\dfrac{n+1}{2}$ (B) $\dfrac{n-1}{2}$

(C) $\dfrac{n}{2}$ (D) $\dfrac{n}{2}+1$

84. The lengths of the sides of a triangle are 5cm, 9cm and 10cm. then length of perpendicular from the opposite vertex to the sides whose length is 10cm is
(A) $\dfrac{6}{5}\sqrt{14}$ (B) $\dfrac{6}{5}\sqrt{13}$

(C) $\dfrac{6}{5}\sqrt{12}$ (D) $\dfrac{6}{5}\sqrt{11}$

85. Mode and median of a given data is given as 160 and 70 respectively. The mean is
(A) 20   (B) 25
(C) 30   (D) 35

86. Which of the following can't be the probability of an event?
(A) $\dfrac{2}{3}$ (b) -1.5

(C) 15%   (D) 0.7

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87. From 21 tickets numbered 1, 2, 3,………., 21; one ticket is drawn at random. The probability that the tickets have a number divisible by 3:

(A) $\dfrac{1}{3}$

(B) $\dfrac{1}{5}$

(C) $\dfrac{1}{7}$

(D) $\dfrac{1}{11}$

88. A right circular cone and a cylinder have a circle of unit radius as base and their heights are equal to the radius itself and a hemisphere has the same radius, then volumes are proportional respectively to

(A) 1:2:3

(B) 3:2:1

(C) 2:1:3

(D) 1:3:2

89. In the case of cuboid, N_0 denotes the number of vertices, N_1 the number of edges and N_2 the number of faces, then

(A) $N_0 + N_1 = N_2 + 2$

(B) $N_0 + N_2 = N_1 + 2$

(C) $N_1 + N_2 = N_0 + 2$

(D) $N_1 + N_2 = 2N_0$

90. Two cubes have volumes in the ratio 1:27, then the ratio of the area of the face of the one to that of the other is

(A) 1:3

(B) 1:6

(C) 1:9

(D) 1:188

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FIITJEE

MAHARASHTRA SCIENCE TALENT SEARCH EXAMINATION
for students of Class 9th Std

Answers

1	2	3	4	5	6	7	8	9	10
C	D	B	D	D	B	B	A	B	B
11	12	13	14	15	16	17	18	19	20
B	D	C	A	A	B	B	D	C	A
21	22	23	24	25	26	27	28	29	30
B	B	C	B	B	A	C	B	C	D
31	32	33	34	35	36	37	38	39	40
B	B	B	B	C	C	C	A	C	A
41	42	43	44	45	46	47	48	49	50
A	D	C	B	B	C	A	C	D	C
51	52	53	54	55	56	57	58	59	60
D	B	A	B	B	D	A	B	B	B
61	62	63	64	65	66	67	68	69	70
B	D	C	A	D	C	D	A	A	B
71	72	73	74	75	76	77	78	79	80
B	A	D	B	C					
81	82	83	84	85	86	87	88	89	90