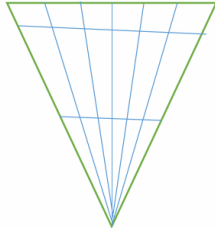




**PART - I****I.Q.**

*This section contains 30 Multiple Choice Questions number 1 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

1. Count the number of triangles in the given image.



- (A) 63  
(B) 55  
(C) 126  
(D) 76
2. If the price of Tata Salt is increased by 20%, then by how much % does a household have to reduce their consumption so that their expenditure remains same?  
(A) 20%  
(B)  $12\frac{1}{2}\%$   
(C)  $\frac{50}{3}\%$   
(D)  $\frac{50}{6}\%$
3. If '+' means '÷', '-' means '×', '÷' means '+' and '×' means '-' then  $15 + 3 \div 9 \times 6 - 2$  is equal to  
(A) 16  
(B) 10  
(C) 2  
(D) 12
4. Car : Garage :: Aeroplane : ?  
(A) Cupboard  
(B) Airport  
(C) Hanger  
(D) Deport
5. Complete the letter sequence aa-bb-aa-abbbb-a  
(A) aabb  
(B) bbaa  
(C) abab  
(D) baba

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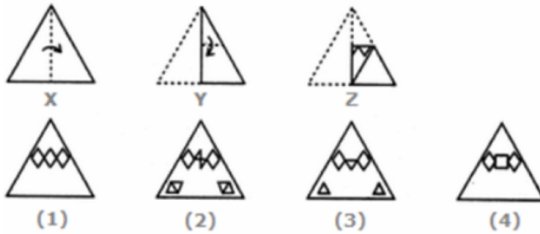
**Space for Rough Work**

6. Find missing number.

5	8	6
24	63	35
575	3968	?

- (A) 1224 (B) 1289  
(C) 1257 (D) 4356

7. Choose a figure which would most closely resemble the unfolded form of figure (Z).



- (A) 1 (B) 2  
(C) 3 (D) 4

8. If the code for BHANU = 23 , SITA = 22 and GEETA = ?

- (A) 32 (B) 45  
(C) 23 (D) None of these

9. Find the missing letter-cluster that can correctly replace the question mark to complete the given series.

ABCD, WXYZ, LMNO, ..? ...

- (A) LMNO (B) CDEF  
(C) IJKL (D) PQRS

10. What will come in place of question (?) mark in the following series?

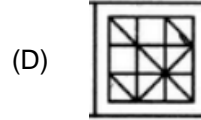
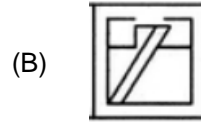
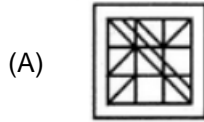
Giant : Dwarf :: Genius : ?

- (A) Wicked (B) Gentle  
(C) Idiot (D) Tiny

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*Space for Rough Work*

11. Find out the best alternative.



12. Make a logical sequence of words:

1. Heel
3. Skull
5. Knee
7. Thigh
9. Face

- (A) 3, 4, 7, 9, 2, 5, 8, 10, 6, 1  
(C) 2, 4, 7, 10, 1, 5, 8, 9, 6, 3

2. Shoulder
4. Neck
6. Chest
8. Stomach
10. Hand

- (B) 3, 9, 4, 2, 10, 6, 8, 7, 5, 1  
(D) 4, 7, 10, 1, 9, 6, 2, 5, 8, 3

13. Pick the odd one out from given data.

- (A) AZ  
(C) IR

- (B) EV  
(D) NO

14. If the code for PARIS is VLUDS then find the code for TOKYO?

- (A) ZCQMO  
(C) CHKML

- (B) RBNRW  
(D) RBSTR

15. Pointing to a picture a man said to his friend, I do not have any brother or sister. But the father of this man is the son of my father, then who's picture of this?

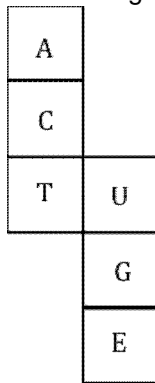
- (A) himself  
(C) his grand father

- (B) his father  
(D) his son

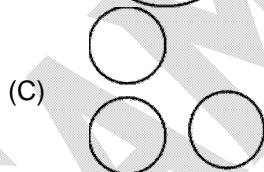
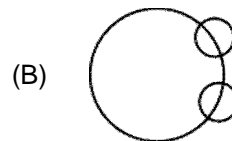
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*Space for Rough Work*

16. When the given figure is folded to form a cube then which face is opposite to the face with A



- (A) T  
(B) U  
(C) C  
(D) G
17. Which bears the same relationship to the third words, as the first two bear.  
Plant : ? :: Flower : Bud  
(A) Leaf  
(B) Twig  
(C) Seed  
(D) Fruit
18. 61, 52, 63, 94, 46, ..?....  
(A) 26  
(B) 36  
(C) 18  
(D) None of these
19. Find odd one out of the following given numbers.  
(A) 8  
(B) 27  
(C) 64  
(D) 125
20. Which one of the following Venn diagrams represents the best relationship between Profit, Bonus, Dividend?



Space for Rough Work

21. Choose the best alternative.

1357 : 192549 :: 2468 : ?

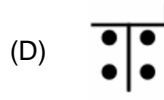
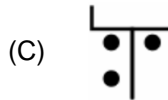
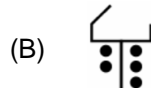
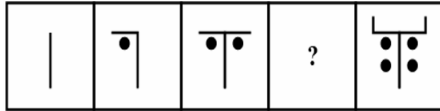
(A) 4163618

(B) 4163664

(C) 4616345

(D) 4567247

22. Find the missing image in the below series



23. **Statements:**

I. All cities are towers

II. Some cities are Ponds

**Conclusions:**

I. All Ponds are towers

II. No Ponds is a towers

III. Some Ponds are towers

(A) Only conclusion (III) follows

(B) Only conclusion (I) follows

(C) Only conclusion (II) follows

(D) None of these

24. Find water image of this given

U4P15B7

(A)

(B)

(C)

(D)

25. Which two signs of the following equation should be interchanged to make it correct?

$$16 - 2 \div 40 + 4 \times 18 = 40$$

(A)  $\div$  and  $-$

(B)  $+$  and  $\times$

(C)  $+$  and  $\div$

(D)  $-$  and  $+$

*Space for Rough Work*

**Questions (26-28): Read the following information carefully and answer the questions given below it.**

- I. Five professors (Dr. Joshi, Dr. Davar, Dr. Natrajan, Dr. Choudhary and Dr. Zia) teach five different subjects (zoology, physics, botany, geology and history) in four universities (Delhi, Gujarat, Mumbai, and Osmania). Do not assume and specific order.
- II. Dr. Choudhary teaches zoology in Mumbai University.
- III. Dr. Natranjan is neither in Osmania University nor in Delhi University and he teaches neither geology nor history.
- IV. Dr. Zia teaches physics but neither in Mumbai University nor in Osmania University.
- V. Dr. Joshi teaches history in Delhi University.
- VI. Two professors are from Gujarat University.
- VII. One professor teaches only one subject and in one University only.

26. Who teaches geology?

- (A) Dr Natrajan (B) Dr. Zia  
(C) Dr. Davar (D) Dr. Joshi

27. Which university is Dr. Zia from?

- (A) Gujarat (B) Mumbai  
(C) Delhi (D) Osmania

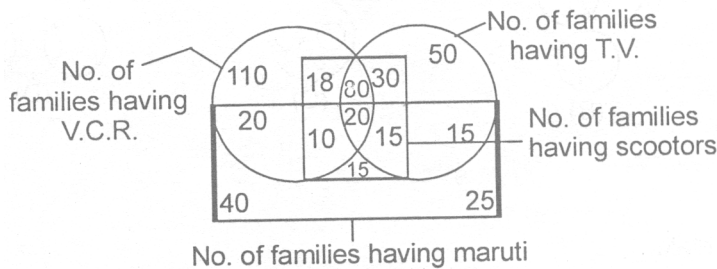
28. Who teaches botany?

- (A) Dr. Zia (B) Dr. Davar  
(C) Dr. Joshi (D) Dr. Natrajan

29. If  $EAT + THAT = APPLE$ , then what is the sum of  $A + P + P + L + E$ ?

- (A) 12 (B) 13  
(C) 14 (D) 15

30. Find out the number of families which have all the four things mentioned in the diagram.



- (A) 40 (B) 30  
(C) 35 (D) 20

**Space for Rough Work**

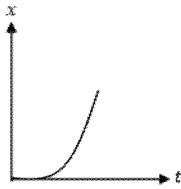
# PART - II : SCIENCE

## SECTION - A

### PHYSICS

This part contains 13 Multiple Choice Questions number 31 to 43. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

31. Motion represented in the following  $x - t$  graph is



- (A) uniform  
(B) accelerated  
(C) retarded  
(D) none of these
32. A car travels  $\frac{1}{3}$ rd distance on a straight road with a velocity of 10 km/h next  $\frac{1}{3}$ rd with 20 km/h and the last  $\frac{1}{3}$ rd with 60 km/h. What is average velocity of the car in the whole journey?  
(A) 4 km/h  
(B) 6 km/h  
(C) 12 km/h  
(D) 18 km/h
33. A block of mass 2 kg is sliding with a constant velocity of 8 m/s on a frictionless horizontal surface. The force exerted on the horizontal surface is nearly.  
(A) zero  
(B) 20N  
(C) 16N  
(D) 10N
34. Newton's first law of motion is  
(A) Qualitative  
(B) Quantitative  
(C) Both qualitative and quantitative  
(D) None of these
35. A body of mass 5 kg undergoes a change in speed from 20  $\text{ms}^{-1}$  to 0.20  $\text{ms}^{-1}$ . The momentum  
(A) increases by 99  $\text{kg ms}^{-1}$   
(B) decreases by 99  $\text{kg ms}^{-1}$   
(C) increases by 101  $\text{kg ms}^{-1}$   
(D) decreases by 101  $\text{kg ms}^{-1}$

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*Space for Rough Work*



36. A ball is projected from tower of height  $h$  metre with speed of  $u \text{ ms}^{-1}$  in horizontal direction. Find the horizontal displacement of ball before it strikes the ground.

(A)  $\sqrt{\frac{2uh}{g}}$

(B)  $\sqrt{\frac{uh}{g}}$

(C)  $\sqrt{\frac{h}{g}}$

(D)  $u\sqrt{\frac{2h}{g}}$

37. The ratio of maximum heights reached by two bodies projected vertically up is  $m:n$ , then the ratio of their initial velocity of is

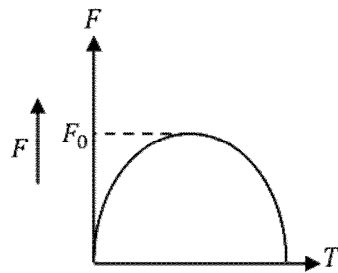
(A)  $m:n$

(B)  $m^2:\sqrt{n}$

(C)  $\sqrt{m}:\sqrt{n}$

(D)  $\sqrt{n}:\sqrt{m}$

38. A particle having mass  $m$  initially at rest is acted upon by a variable force  $F$  for time interval  $T$ . The F-T graph is semicircular as shown in the figure. The velocity of the particle is  $u$  after time  $T$ . Then



(A)  $u = \frac{\pi F_0^2}{8m}$

(B)  $u = \frac{\pi T^2}{8m}$

(C)  $u = \frac{\pi F_0 T}{4m}$

(D)  $u = \frac{\pi F_0 T}{2m}$

39. A 50 gm bullet moving with speed of 400 m/s stop after penetrating 4 cm of bone. Calculate average force exerted by bullet.

(A)  $10^4 \text{ N}$

(B)  $2 \times 10^4 \text{ N}$

(C)  $3 \times 10^4 \text{ N}$

(D)  $4 \times 10^4 \text{ N}$

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*Space for Rough Work*

40. A machine gun fires a bullet of mass 4 kg with velocity 12 m/s. The person holding it can apply a maximum force of 144N on the gun. What is maximum no of bullets that can be fired per second.
- (A) 3 (B) 4  
(C) 5 (D) 7
41. A body is projected vertically upward from a point on the ground with speed of 40 m/s. Velocity of the body at maximum height is
- (A)  $5 \text{ ms}^{-1}$  (B)  $10 \text{ ms}^{-1}$   
(C)  $20 \text{ ms}^{-1}$  (D) None of these
42. A body travels with an acceleration  $a_1$  for time  $t_1$  and acceleration  $a_2$  for time  $t_2$ ,  $t_1$  and  $t_2$  being successive time intervals, then the average acceleration of body is
- (A)  $\frac{a_1 t_1 + a_2 t_2}{2t_1 + t_2}$  (B)  $\frac{a_1 t_1 + a_2 t_2}{t_1 + t_2}$   
(C)  $\frac{a_1 + a_2}{t_1 + t_2}$  (D)  $\frac{a_1 t_1 - a_2 t_2}{t_1 + t_2}$
43. An elevator of mass 2000 kg is accelerating upward. If the upward tension in supporting cable is 29000N. Find the upward acceleration.
- (A)  $2.5 \text{ ms}^{-2}$  (B)  $3.5 \text{ ms}^{-2}$   
(C)  $4.5 \text{ ms}^{-2}$  (D)  $5 \text{ ms}^{-2}$

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Space for Rough Work

**SECTION - A****CHEMISTRY**

**This part contains 13 Multiple Choice Questions number 44 to 56. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.**

44. What is the chemical formula of stannic nitrite?  
 (A)  $\text{Sn}(\text{NO}_3)_2$  (B)  $\text{Sn}(\text{NO}_3)_3$   
 (C)  $\text{Sn}(\text{NO}_2)_4$  (D)  $\text{Sn}(\text{NO}_2)_2$
45. What is the formula unit mass of  $\text{K}_2\text{CO}_3$ ?  
 (A) 79 (B) 122  
 (C) 126 (D) 138
46. **Statement X:** Mercury has melting point  $-38.83^\circ\text{C}$   
**Statement Y:** Alcohol thermometer is used to measure the temperature below  $-38.83^\circ\text{C}$   
 (A) Statement X & Y are correct, Y is proper explanation of X  
 (B) Statement X & Y are correct but Y is not proper explanation of X  
 (C) X is correct Y is incorrect  
 (D) Both X and Y are incorrect
47. **Which of the following gas is not reason for acid rain?**  
 (A)  $\text{NO}_2$  (B)  $\text{CO}_2$   
 (C)  $\text{CH}_4$  (D)  $\text{SO}_3$
48. Which of the following element has maximum number of allotropes?  
 (A) Nitrogen (B) Carbon  
 (C) Oxygen (D) Chlorine
49. Match the following column:

Column X	Column Y
(i) Baking soda	(a) Cement production
(ii) Bleaching powder	(b) dis-infectant
(iii) Quick lime	(c) Fire extinguishing
	(d) Glass production

- (A) (i)-(a); (ii)-(d); (iii)-(b), (c) (B) (i)-(a); (ii)-(b); (iii)-(c), (d)  
 (C) (i)-(c); (ii)-(d); (iii)-(a), (b) (D) (i)-(c); (ii)-(b); (iii)-(a), (d)

**Space for Rough Work**

50. Diffusion rate is highest among the following gases is  
(A)  $\text{H}_2\text{S}$  (B)  $\text{HCl}$   
(C)  $\text{N}_2\text{O}_4$  (D)  $\text{SF}_6$
51. Which of the following mixture shows Tyndall effect?  
(A) Dilute milk solution (B) NaCl solution  
(C) Liquor ammonia (D) Soda water
52. Which of the following is not conductor of electricity?  
(A) Graphite (B) Kerosene  
(C) Distilled water (D) Both (B) and (C)
53. Salt disappears in water, due to  
(A) Ionization (B) Melting  
(C) Dissociation (D) Combination
54. Which of the following is not a true solid?  
(A) Ice (B) Dry ice  
(C) Glass (D) All of these
55. Wheat grains can be separated from husk by \_\_\_\_\_ process. Fill in the blanks.  
(A) Sedimentation (B) Decantation  
(C) Filtration (D) Centrifugation
56. Which one has maximum number of molecules?  
(A) 7 g  $\text{N}_2$  (B) 2 g  $\text{H}_2$   
(C) 16 g  $\text{NO}_2$  (D) 16 g  $\text{O}_2$

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*Space for Rough Work*



**PART - III****MATHEMATICS**

This section contains **30 Multiple Choice Questions** number **61 to 90**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

61. Factors of  $x^4 + x^2y^2 + y^4$  is  
 (A)  $x^4 + y^4$  (B)  $x^2 + y^2 + (xy)^2$   
 (C)  $x^2 + y^2 + xy$  (D)  $x^4 + y^4 + xy$
62. If  $x = 5 + 2\sqrt{6}$ , then the value of  $\sqrt{x} - \frac{1}{\sqrt{x}} =$   
 (A)  $5\sqrt{2}$  (B)  $4\sqrt{2}$   
 (C)  $2\sqrt{2}$  (D)  $2\sqrt{3}$
63. The conversion of  $0.0\overline{37}$  in the form of  $\frac{p}{q}$  is  
 (A)  $\frac{37}{990}$  (B)  $\frac{37}{999}$   
 (C)  $\frac{37}{1000}$  (D)  $\frac{37}{100}$
64. Find the value of  $x$  if,  $2^{x+1} + 2^x + 2^{x-1} = 28$   
 (A) 2 (B) 1  
 (C) 3.5 (D) 3
65. In what ratio does the point  $P(7, 3)$  divide the line segment joining  $A(4, -3)$  and  $B(9, 7)$ ?  
 (A) 2:3 (B) 3:4  
 (C) 3:3 (D) 3:2
66. For what value of  $x$ ,  $4^{\sqrt{x+1}} - 2^{\sqrt{x+1}+2} = 0$ ?  
 (A) 2 (B) 3  
 (C) 2.5 (D) 3.5
67.  $\pi$  is an  
 (A) Improper fraction (B) A proper fraction  
 (C) A rational number  $\left(\frac{22}{7}\right)$  (D) None of these

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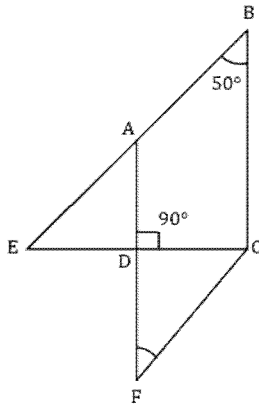
Space for Rough Work

68. Which of the following rational numbers does not lie between  $\frac{1}{30}$  and  $\frac{1}{10}$ ?

(A)  $\frac{19}{30}$   
(C)  $\frac{7}{10}$

(B)  $\frac{2}{3}$   
(D)  $\frac{16}{30}$

69. In the given figure,  $BA$  and  $BC$  are produced to meet  $CD$  and  $AD$  produced in  $E$  and  $F$ . Then  $\angle AED + \angle CFD =$



(A)  $80^\circ$   
(C)  $40^\circ$

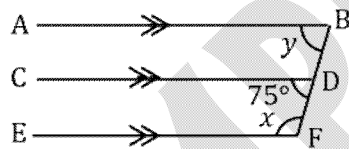
(B)  $50^\circ$   
(D)  $160^\circ$

70. The meeting points of three perpendicular sides bisector of a triangle is known as

(A) Incentre  
(C) Centroid

(B) Circumcentre  
(D) Orthocentre

71. In the figure  $AB \parallel CD \parallel EF$ . Then the value of  $x$  and  $y$  respectively are

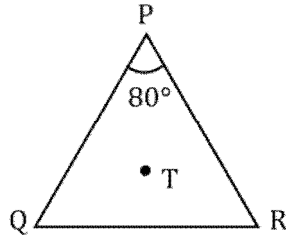


(A)  $75^\circ, 105^\circ$   
(C)  $100^\circ, 80^\circ$

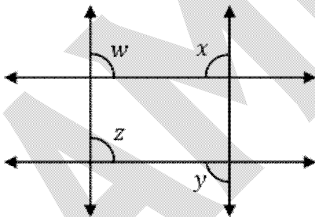
(B)  $105^\circ, 75^\circ$   
(D)  $80^\circ, 100^\circ$

Space for Rough Work

72. In the given figure,  $TQ$  and  $TR$  are bisectors of  $\angle Q$  and  $\angle R$  respectively. If  $\angle QPR = 80^\circ$  and  $\angle PRT = 30^\circ$ , then  $\angle TQR =$



- (A)  $20^\circ$  (B)  $130^\circ$   
 (C)  $90^\circ$  (D)  $80^\circ$
73. If  $a + b + c = 0$ , then the value of  $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} =$   
 (A) 1 (B)  $-1$   
 (C) 0 (D) 3
74. If  $x^2 + \frac{1}{x^2} = 62$ , then the value of  $x^4 + \frac{1}{x^4}$  is  
 (A)  $8^4 - 2^8 - 2$  (B)  $8^4 + 2$   
 (C)  $8^4 - 2^8 + 2$  (D)  $8^4 + 2^8 + 2$
75. The simplified value of  $\frac{1}{\sqrt{2+\sqrt{3}-\sqrt{5}}} + \frac{1}{\sqrt{2-\sqrt{3}-\sqrt{5}}}$  is  
 (A) 1 (B) 0  
 (C)  $\sqrt{2}$  (D)  $\frac{1}{\sqrt{2}}$
76. If  $a + b = \sqrt{7}$  and  $a - b = \sqrt{5}$ , then the value of  $8ab(a^2 + b^2)$  is  
 (A) 24 (B) 36  
 (C) 12 (D) 14
77. In the given figure, if  $l_1 \parallel l_2$ , then  $(x + y)$  in terms of  $w$  and  $z$  is



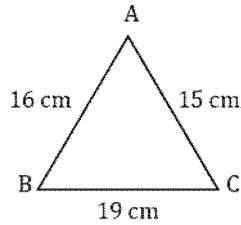
- (A)  $180 - w + z$  (B)  $180 + w + z$   
 (C)  $180 + w - z$  (D)  $180 - w - z$

Space for Rough Work



78. Which side lengths of a triangle is NOT possible to construct?  
 (A) 8.3 cm, 3.4 cm, 6.1 cm (B) 6 cm, 7 cm, 10 cm  
 (C) 3 cm, 5 cm, 5 cm (D) 5.4 cm, 2.3 cm, 3.1 cm

79. In the figure, which of the following statement is correct?

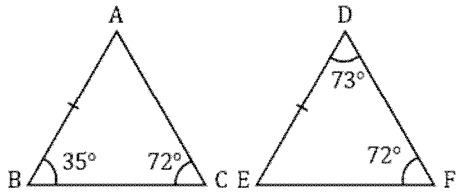


- (A)  $\angle B = \angle C$  (B)  $\angle B$  is smallest angle  
 (C)  $\angle B$  is greatest angle (D)  $\angle A$  is smallest angle
80. Upon expressing  $0.6 + 0.\bar{7} + 0.4\bar{7}$  in  $\frac{p}{q}$  form  $p - q = ?$   
 (A) 77 (B) 72  
 (C) 67 (D) 87
81. The digit at the 100<sup>th</sup> place in decimal representation of  $\frac{6}{7}$  is  
 (A) 1 (B) 2  
 (C) 5 (D) 4
82.  $xy$  is a number that is divided by  $ab$  ( $xy < ab$ ) and gives a result  $0.xyxyxy\dots$ , then  $ab =$   
 (A) 11 (B) 33  
 (C) 99 (D) 66
83.  $\frac{x+a}{b+c} + \frac{x+b}{a+c} + \frac{x+c}{a+b} + 3 = 0$ , ( $a, b, c > 0$ ) then  $x =$   
 (A)  $(a + b + c)$  (B)  $-(a + b + c)$   
 (C)  $a - b - c$  (D)  $a - b + c$

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Space for Rough Work

84. In the given figure  $\triangle ABC \cong \triangle DEF$  by



- (A) SAS  
(B) ASA  
(C) SSS  
(D) RHS
85. If the distance of  $P(x, y)$  from  $A(5, 1)$  and  $B(-1, 5)$  are equal, then  
(A)  $3x = 2y$   
(B)  $x = 2y$   
(C)  $x = y$   
(D)  $x + y = 0$
86.  $5! = 1 \times 2 \times 3 \times 4 \times 5$   
 $7! = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7$   
Similarly,  $n! = 1 \times 2 \times 3 \times \dots \times (n-1) \times n$   
Using the above concept, calculate the last two digit in  $1! + 2! + 3! + \dots + 100!$   
(A) 00  
(B) 13  
(C) 57  
(D) 23
87. The coordinates of the point on a circle in first quadrant whose abscissa is 3 is  
(A) 8  
(B)  $(3, -3)$   
(C)  $(\frac{2}{\sqrt{10}}, 3)$   
(D)  $(3, \frac{2}{\sqrt{10}})$
88. The type of triangle formed on joining the points  $(1, -1), (-1, 1), (\sqrt{3}, \sqrt{3})$  is  
(A) Scalene  
(B) Isosceles  
(C) Equilateral  
(D) Right-angled
89. If  $(\frac{a}{b})^{x-1} = (\frac{b}{a})^{x-3}$ , then  $x =$   
(A) -1  
(B) 1  
(C) 2  
(D) 3
90.  $x^n - a^n$  is divisible by  $(x - a)$  for  $n =$   
(A) odd values  
(B) even values  
(C) both (A) and (B)  
(D) positive integer

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*Space for Rough Work*

# FIITJEE

## Maharashtra Science Talent Search Examination - 2023 (only for Maharashtra State Students)

for students presently in **Class IX**

### SAMPLE PAPER

### ANSWER KEYS (SAMPLE PAPER)

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