

# FIITJEE Talent Reward Exam

for student presently in  
**Class 7**



Time: 3 Hours

**CODE 7A**

Maximum Marks: 194

## Instructions:

Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.

- You are advised to devote 1 Hour on Section-I and 2 Hours on Section-II and Section-III.**
- This Question paper consists of 3 sections. All questions will be multiple choice single correct out of four choices with marking scheme in table below:

Section		Question no.	Marking Scheme for each question		
			correct answer	wrong answer	
<b>SECTION – I</b> (IQ)		Q. 1 to 12	+2	0	
		Q. 13 to 16	+3	-1	
		Q. 17 to 20	+6	0	
<b>SECTION – II</b> (MATHEMATICS)		Q. 21 to 23	+6	-1	
		Q. 24 to 26	+8	-2	
		Q. 27 to 30	+8	-3	
<b>SECTION – III</b> (SCIENCE & MATHEMATICS)	Part –A	Physics	Q. 31 to 36	+3	-1
	Part –B	Chemistry	Q. 37 to 42	+3	-1
	Part –C	Mathematics	Q. 43 to 50	+3	-1

- Answers have to be marked on the OMR sheet.
- The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
- Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
- Before attempting paper write your Name, Registration number and Test Centre** in the space provided at the bottom of this sheet.

Note:

Check all the sheets of this question paper. Please ensure the same SET is marked on header of all the sheets inside as indicated above 'Maximum Marks' of this page. In case SET marked is not the same on all pages, immediately inform the invigilator and CHANGE the Questions paper.

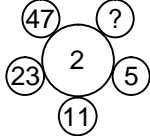
Registration Number :

Name of the Candidate : \_\_\_\_\_

Test Centre : \_\_\_\_\_

**Time: 1 Hour**  
**IQ**  
**Section –I**

**Section-I****IQ**

1. If first half of the English alphabet is written in reverse order, then which letter will be 9<sup>th</sup> to the left of the 18<sup>th</sup> letter from the left?  
 (A) G (B) H  
 (C) E (D) L
2. Find the missing number.  
  
 (A) 95 (B) 100  
 (C) 94 (D) 96
3. If '+' means 'x', '-' means '+', 'x' means '÷' and '÷' means '-', then find the value of  $9 + 8 \times 2 - 16 \div 4$  is  
 (A) 28 (B) 48  
 (C) 35 (D) 40
4. If 'NEW DELHI' is coded as 'RSOVDVM', then the code for 'TIMBAKTU' is  
 (A) GRNYZPGF (B) FGPZYNRG  
 (C) FGPZNYRG (D) FHPZYNRH
5. Find the odd one out.  
 (A) 16 (B) 625  
 (C) 2401 (D) 6560

**Directions (Q. 6 to 8):** Find the next / missing term which will fit in the given series / pattern.

6. 145, 122, 101, 82, 65, \_\_\_\_  
 (A) 45 (B) 50  
 (C) 49 (D) 55
7. QYK, \_\_\_\_, ISG, EPE  
 (A) NWJ (B) MVI  
 (C) NVI (D) MVJ


---

**Space for Rough Work**

8. \_\_ac\_\_baa\_\_aba\_\_cab

- (A) aaca (B) aaac  
(C) acca (D) accc

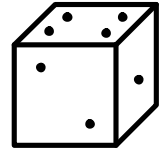
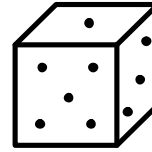
9. Find the mirror image of the following:

HANDI 2013 

- (A) 2013 HANDI (B) HANDI 2013  
(C)  $\varepsilon \uparrow 0 \Sigma I Q \uparrow A H$  (D)  $\varepsilon \uparrow 0 \Sigma I Q \downarrow N A H$

10. Two positions of a dice are shown. When there are two dots at the bottom, then the number of dots at the top will be

- (A) 5 (B) 2  
(C) 6 (D) 3



11. Katrina ran 20 m to the east, then she turned left and walked for 15 m, then turned right and went 25 m and then turned right again and went 15 m. How far is she now from the starting point?

- (A) 15 m (B) 25 m  
(C) 35 m (D) 45 m

12. Find the analogy.

Burglar : House :: Pirate : ?

- (A) Sea (B) Ship  
(C) Sailor (D) Crew

13. P is Q's sister, R is Q's mother, S is R's father and T is S's mother. Then how is S related to P?

- (A) Sister (B) Mother  
(C) Grandmother (D) Grandfather

**Directions (Q. 14 to 15):** Read the following information carefully and then answer the questions based on them.

(i)  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ ,  $\phi$ ,  $\psi$  and  $\mu$  are seven persons and are sitting together in a row facing south.

(ii)  $\psi$  is second from his left and immediate right of  $\alpha$ .

(iii)  $\phi$  is third to the right of  $\delta$ .

(iv)  $\mu$  is at an extreme end and right of  $\beta$ .

(v)  $\gamma$  is in middle.

(vi)  $\phi$  is between  $\mu$  and  $\beta$ .

14. Who is sitting on the right of  $\alpha$ ?

- (A)  $\psi$  (B)  $\beta$   
(C)  $\phi$  (D)  $\mu$

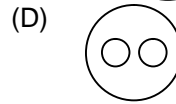
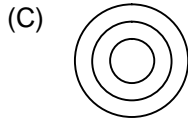
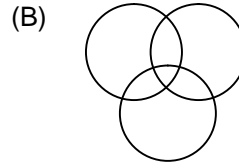
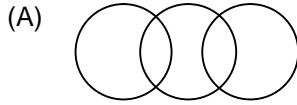
15. Where is  $\beta$  sitting?

- (A) between  $\mu$  and  $\phi$  (B) between  $\gamma$  and  $\psi$   
(C) between  $\phi$  and  $\gamma$  (D) between  $\psi$  and  $\delta$

---

**Space for Rough Work**

16. Which diagram represents best the following:  
Women, Teachers, Students



**Directions (Q. 17 to 18):** Read the following information carefully and answer the questions that follow:  
P, Q, R, S, T, U and V are players. P, Q, R, S play chess. T, U, V play football. S, T, U play volleyball. P, Q, S play tennis. T, U, V play cricket. R, S, T play badminton.

17. Who among the following plays maximum games?

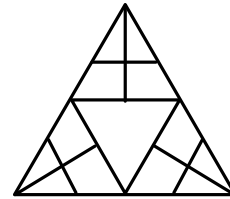
- (A) P (B) T  
(C) U (D) R

18. Who among the following plays minimum number of games?

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

19. Find the number of triangles in the diagram.

- (A) 20 (B) 24  
(C) 18 (D) 22



20. If  $62 + 32 = 6$ ,  $56 + 23 = 24$ , then  $45 + 10 = ?$

- (A) 20 (B) 4  
(C) 25 (D) 16

---

*Space for Rough Work*

**Time: 2 Hours**  
**Section –II**  
**&**  
**Section –III**

**Section-II****Mathematics****Comprehension – 1 (Question No. 21-23)**

**Median:** If the raw data is arranged in increasing or decreasing order of magnitude, then the middle-most value in this arrangement is called the **median**.

- (a) When the number of observations ( $n$ ) is odd, then the median is value of  $\left(\frac{n+1}{2}\right)^{\text{th}}$  observation.
- (b) If the number of observations ( $n$ ) is even, then the median is the mean of the  $\left(\frac{n}{2}\right)^{\text{th}}$  observation and  $\left(\frac{n}{2} + 1\right)^{\text{th}}$  observation.
21. The median of 10, 12,  $x$ , 6, 18 is 10. Which of the following is true about the value of  $x$ ?  
(A)  $6 \leq x \leq 10$  (B)  $x < 6$   
(C)  $x > 18$  (D) either (A) or (B)
22. If 10, 15, 16,  $x$ ,  $x + 1$ , 20, 27, 28 is a data arranged in increasing order and median of the data is 18.5. The value of  $x$  is  
(A) 18 (B) 28  
(C) 38 (D) 185
23. The median of data 21, 33, 15, 19, 26, 32, 14 and 24 is  
(A) 20.5 (B) 21.5  
(C) 22.5 (D) 23.5

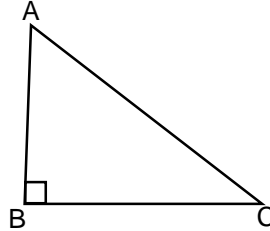
**Space for Rough Work**

---

**Comprehension – 2 (Question No. 24-26)**


---

**Pythagoras Theorem:** In a right triangle, the square of hypotenuse is equal to the sum of the squares of its two other sides. Let  $\triangle ABC$  be a right triangle with right angled at B. By Pythagoras Theorem,  $AC^2 = AB^2 + BC^2$ .



24. Two poles of height 9 m and 14 m stand upright on a plane ground. If the distance between their feet is 12 m. The distance between their tops is  
 (A) 15 m (B) 14 m  
 (C) 13 m (D) 12 m
25. A plant which was 90 cm high broke at a point in a storm but did not separate. Its top touched the ground at a distance of 27 cm from its base. The height of the point from the ground at which the plant broke is  
 (A) 40.95 cm (B) 49.05 cm  
 (C) 45 cm (D) 48.05 cm
26. A man goes 24 m due East and then 10 m due North. How far is he from the initial position?  
 (A) 25 m (B) 25.5 m  
 (C) 26 m (D) 27 m

---

**Space for Rough Work**



**Comprehension – 3 (Question No. 27-30)**

---

**Absolute value of an integer or modulus**

The absolute value of an integer is its numerical value irrespective of its sign or nature.

The absolute value of an integer  $x$  is written as  $|x|$  and is defined as

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

For example,  $|-7| = 7$  and  $|3| = 3$ , etc.

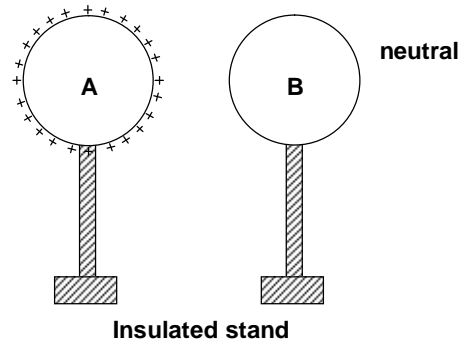
27. If  $|x| = 5$ , then two values of  $x$  are  
(A) 5, -5 (B) -3, -7  
(C) -3, 7 (D) -1, 1
28. The value of the expression  $27 - |-8|$  is  
(A) 0 (B) 19  
(C) 27 (D) 35
29. The value of  $\left| \frac{-2}{7} \right| \left| \frac{-7}{-3} \right|$  is  
(A)  $\frac{2}{3}$  (B)  $\frac{2}{-3}$   
(C)  $\frac{-2}{3}$  (D) 1
30. The value of  $\frac{|-0.56|}{|-0.7|}$  is  
(A) 8 (B) 0.8  
(C) 0.08 (D) -8
- 

*Space for Rough Work*

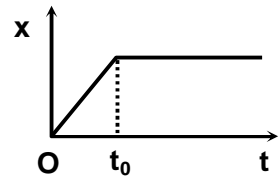
**Section-III****Science & Mathematics****Physics (Part – A)**

31. When ice is converted into water, the physical quantity which changes is  
 (A) Volume (B) latent heat  
 (C) mass (D) none
32. Vacuum between the walls of a flask reduces heat transfer by  
 (A) conduction only (B) radiation only  
 (C) convection only (D) both conduction and convection

33. There are two identical conducting bodies A and B. Body-A is given positive charge  $Q$  as shown in the figure. Now A touches B for a moment and gets separated, then choose incorrect statement.  
 (A) B gets positively charged  
 (B) B gets negatively charged  
 (C) A and B will have equal amounts of charge  
 (D) A and B both have positive charges.



34. A ball is thrown up with a certain velocity. It attains maximum height of 40 m and comes back to the thrower, then the  
 (A) total distance travelled by the body is 40 m (B) total displacement of the body is 80 m  
 (C) total displacement is zero (D) total distance travelled by the body is zero.
35. By inserting a soft iron piece into a current carrying coil, the strength of the magnetic field  
 (A) increases (B) decreases  
 (C) first increases then decreases (D) remains unchanged
36. Given figure shows the distance time graph of a particle moving along the x-axis.  
 (A) the particle is continuously going in positive x-direction  
 (B) the particle is at rest  
 (C) the speed increases up to a time  $t_0$ , and then becomes constant  
 (D) the particle moves at a constant speed up to a time  $t_0$  and then stops.

**Space for Rough Work**

## Chemistry (Part – B)

---

37. A piece of fabric burns by giving smell of burning hair. It is made up of  
 (A) Natural silk (B) Artificial silk  
 (C) Natural wool (D) Both (A) & (C)
38. Which of the following are chemical changes?  
 (i) Breaking down of ozone into oxygen  
 (ii) Heating of hacksaw blade to red hot stage  
 (iii) Acid rain  
 (iv) Beating aluminium to make aluminium foil  
 (A) (i), (ii) and (iii) (B) (i) and (iii)  
 (C) (ii) and (iv) (D) (ii), (iii) and (iv)
39. Conversion of liquefied petroleum gas from liquid form in cylinder to gaseous form is  
 (A) Physical change (B) Chemical change  
 (C) Undesirable change (D) Both (B) & (C)
40. Match the column I with column II
- |     | Column – I |     | Column – II                     |
|-----|------------|-----|---------------------------------|
| (a) | Shearing   | (p) | Cleaning sheared skin           |
| (b) | Burrs      | (q) | Morus alba                      |
| (c) | Mulberry   | (r) | Small fluffy fibre              |
| (d) | Scouring   | (s) | Removal of fleece from the body |
- (A) a → q, b → p, c → r, d → s  
 (B) a → s, b → r, c → q, d → p  
 (C) a → p, b → r, c → s, d → q  
 (D) a → r, b → q, c → p, d → s
41. The dilute solutions of which of the following are not harmful to drink  
 (i) Magnesium hydroxide (ii) Potassium hydroxide  
 (iii) Sodium hydrogen carbonate (iv) Sodium carbonate  
 (A) (i) & (ii) (B) (ii) & (iii)  
 (C) (i) & (iii) (D) (ii) & (iv)
42. Rohit took a paper blotted with solution X. He dipped the paper in sulphuric acid. It turned red. What do you think the paper was blotted with?  
 (A) Turmeric (B) Phenolphthalein  
 (C) Onion extract (D) Methyl orange

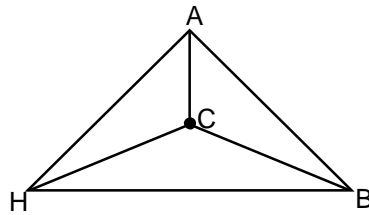
---

**Space for Rough Work**

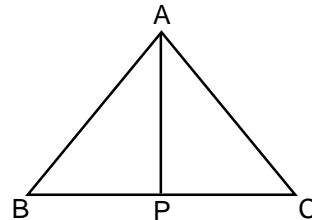
**Mathematics (Part – C)**

43. What must be subtracted from  $-3$  to get  $-9$ ?  
 (A)  $-6$  (B)  $12$   
 (C)  $6$  (D)  $-12$
44. The sum of  $3\frac{1}{5} + 2\frac{1}{10} - 1\frac{1}{2} - \frac{1}{4}$  is  
 (A)  $2\frac{11}{30}$  (B)  $3\frac{7}{20}$   
 (C)  $4\frac{11}{30}$  (D)  $3\frac{11}{20}$
45. In a triangle ABC, if  $3\angle A = 4\angle B = 6\angle C$ , then the value of angle A is  
 (A)  $60^\circ$  (B)  $80^\circ$   
 (C)  $20^\circ$  (D)  $100^\circ$
46. In a triangle ABC,  $AB = 5$  cm and  $BC = 4$  cm. Which of the following is true?  
 (A)  $1$  cm  $<$   $CA <$   $9$  cm (B)  $2$  cm  $<$   $CA <$   $10$  cm  
 (C)  $4$  cm  $<$   $CA <$   $5$  cm (D)  $1$  cm  $<$   $CA <$   $5$  cm

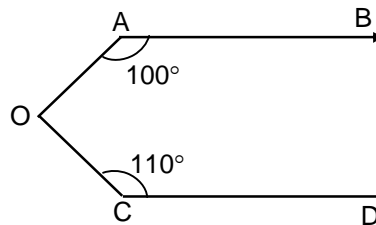
47. In the given figure,  $\triangle ACB \cong \triangle ACH \cong \triangle BCH$ . The value of  $\angle BCH$  is  
 (A)  $60^\circ$   
 (B)  $30^\circ$   
 (C)  $120^\circ$   
 (D)  $45^\circ$



48. If the mean of  $2, 3, x, 7, 8$  is  $x$ , then the value of  $x$  is  
 (A)  $5$  (B)  $3$   
 (C)  $4$  (D)  $2$
49. In the given figure, P is a point on the side BC of  $\triangle ABC$ . Which of the following inequality is true?  
 (A)  $AB + BC + AC > AP$   
 (B)  $AB + BC + AC < AP$   
 (C)  $AB + BC + AC > 2AP$   
 (D)  $AB + BC + AC < 2AP$



50. In the given figure, it is given that  $AB \parallel CD$ ,  $\angle BAO = 100^\circ$  and  $\angle OCD = 110^\circ$ . The value of  $\angle AOC$  is  
 (A)  $210^\circ$   
 (B)  $80^\circ$   
 (C)  $140^\circ$   
 (D)  $150^\circ$



*Space for Rough Work*

# FIITJEE TALENT REWARD EXAM

(FTRE-2013)

## CLASS VII HINTS (SET-A)

1. (C) MLKJIHGFEDCBANOPQRSTUVWXYZ  
                                   ↓                                  ↓  
                                   9<sup>th</sup> left from R      18<sup>th</sup> from left

Hence Answer is (C).

2. (A)  $5 \times 2 + 1 = 11$   
 $11 \times 2 + 1 = 23$   
 $23 \times 2 + 1 = 47$   
 $47 \times 2 + 1 = 95$

Hence Answer is (A).

3. (B) Using the conversions of signs as given in the question.  
 $9 \times 8 \div 2 + 16 - 4$   
 $= 9 \times 4 + 12 = 36 + 12 = 48$   
 Hence Answer is (B).

4. (B) NEWDELHI  
           RSOVWDVM

Coding is being done by taking equidistant pair of alphabets from the beginning & from the end and then by reversing it.

Hence,

TIMBAKTU  
           FGPZYNRG

Hence Answer is (B).

5. (D)  $16 = 2^4$   
 $625 = 5^4$   
 $2401 = 7^4$   
 But 6560 is not fourth power of any numbers.  
 Hence Answer is (D).

6. (B)  $145 = 12^2 + 1$   
 $122 = 11^2 + 1$   
 $101 = 10^2 + 1$

$$82 = 9^2 + 1$$

$$65 = 8^2 + 1$$

$$50 = 7^2 + 1$$

Hence Answer is (B).

7. (B)
- |    |    |    |    |    |   |   |    |   |   |    |   |
|----|----|----|----|----|---|---|----|---|---|----|---|
| 17 | 25 | 11 | 13 | 22 | 9 | 9 | 19 | 7 | 5 | 16 | 5 |
| Q  | Y  | K  | M  | V  | I | I | S  | G | E | P  | E |

First alphabet of each term decreasing by 4, second alphabet decreasing by 3 and third alphabet decreasing by 2

Hence Answer is (B).

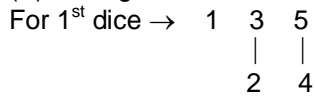
8. (A)  $\underline{a} \ a \ \underline{c} \ \underline{a} \ b / a \ a \ \underline{c} \ a \ b / a \ \underline{a} \ c \ a \ b /$

Hence Answer is (A).

9. (C) HANDI 2013 HANID 3012

Hence Answer is (C).

10. (A) Taking one dot common to both and clock wise we have

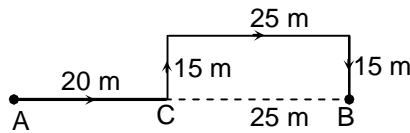


i.e. 3 is opposite to 2.

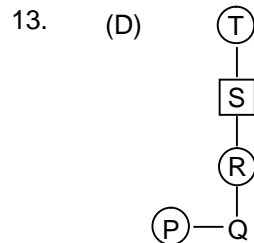
5 is opposite to 4.

Hence Answer is (A).

11. (D)  $AB = AC + BC$   
 $= 20 + 25 = 45 \text{ m}$   
 Hence Answer is (D).



12. (B) Burglar robs house and pirates rob ship. Hence Answer is (B).

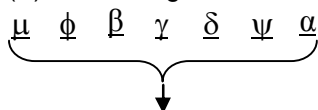


denotes female.

denotes male.

From diagram S is grand-father of P. Hence Answer is (D).

14. (A) The arrangement is shown as below:



All facing down i.e. south

Hence Answer is (A).

15. (C) From above arrangement shown in Q. 14 Answer is (C).

16. (A) Few women can be teachers, few women can be students and teachers and students are different profession. Hence Answer is (A)

17. (B)

Players/Game	Chess	Football	Volleyball	Tennis	Cricket	Badminton
P	√			√		
Q	√			√		
R	√					√
S	√		√	√		√
T		√	√		√	√
U		√	√		√	
V		√			√	

P plays 2 games

T plays 4 games

U plays 3 games

R plays 2 games, Hence Answer is (B).

18. (D) From table of Q. 17 we have

U plays 3 games

S plays 4 games

T plays 4 games

V plays 2 games, Hence Answer is (D).

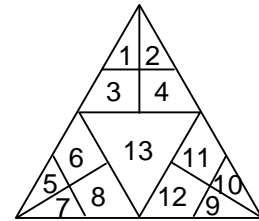
19. (A) Taking one at a time 1, 2, 5, 7, 9, 10, 13 → (7) Triangles.

Two at a time (1, 2) (1, 3) (2, 4) (5, 7) (5, 6) (7, 8) (9, 10) (9, 12) (10, 11) → (9) Triangles.

Four at a time (1, 2, 3, 4) (5, 6, 7, 8) (9, 10, 11, 12) → (3) Triangles.

Taking all at a time → (1) Triangle.

Hence total no. of triangles = 20. Hence Answer is (A).



20. (A)  $(6 \times 2) - (3 \times 2) = 6$

$$(5 \times 6) - (2 \times 3) = 24$$

Hence  $(4 \times 5) - (1 \times 0) = 20$ . Hence Answer is (A).

21. Median of data is 10 and number of observations is 5.

$$\text{So, median} = \frac{5+1}{2}^{\text{th}} \text{ observation} = 3^{\text{rd}} \text{ observation.}$$

$$\therefore x < 6 \text{ or } 6 \leq x \leq 10$$

$$\text{i.e., } x, 6, 10, 12, 18$$

when  $x < 6$

or  $6, x, 10, 12, 18$

when  $6 \leq x \leq 10$

22.  $n = \text{number of observations} = 8$

$$\therefore \text{median} = \frac{\frac{n}{2}^{\text{th}} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ observations}}{2}$$

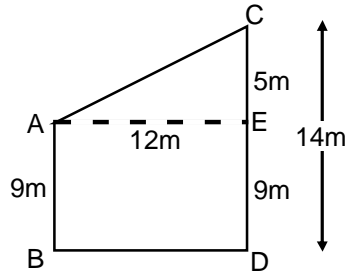
$$\Rightarrow 18.5 = \frac{4^{\text{th}} + 5^{\text{th}} \text{ observations}}{2}$$

$$\Rightarrow 18.5 = \frac{x + x + 1}{2}$$

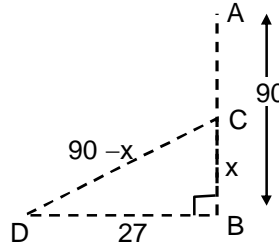
$$\begin{aligned} \Rightarrow 37 &= 2x + 1 \\ \Rightarrow \frac{36}{2} &= x \\ \Rightarrow x &= 18. \end{aligned}$$

23. 14, 15, 19, 21, 24, 26, 32, 33  
 n = number of observations = 8  
 $\therefore$  median =  $\frac{21+24}{2} = \frac{45}{2} = 22.5$ .

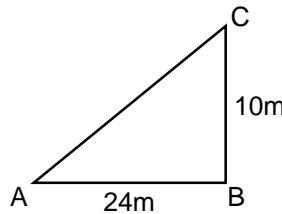
24. The distance between their tops  
 $= \sqrt{5^2 + 12^2}$   
 $= \sqrt{169} = 13$  m



25. By Pythagoras Theorem  
 $(90 - x)^2 = x^2 + 27^2$   
 $8100 + x^2 - 180x = x^2 + 729$   
 $7371 = 180x$   
 $x = \frac{7371}{180} = 40.95$  cm.



26.  $AC = \sqrt{24^2 + 10^2}$   
 $= \sqrt{576 + 100}$   
 $= \sqrt{676} = 26$  m



27. As  $|5| = 5$  and  $|-5| = 5$   
 $\therefore x = 5, -5$ .

28.  $27 - |-8|$   
 $= 27 - 8 = 19$ .

29.  $\left| \frac{-2}{7} \right| \left| \frac{-7}{-3} \right|$   
 $= \frac{2}{7} \times \frac{7}{3} = \frac{2}{3}$ .

30.  $\frac{|-0.56|}{|-0.7|} = \frac{0.56}{0.7} = \frac{560}{700} = \frac{56}{70} = 0.8$ .

31. When ice is converted into water, the physical quantity which changes is volume.

32. Vacuum between the walls of a flask reduces heat transfer by both conduction and convection.



33. When A touches B for a moment and gets separated, then B will not get negatively charged
34. A ball is thrown up with a certain velocity. It attains maximum height of 40 m and comes back to the thrower, then the total displacement is zero.
35. By inserting a soft iron piece into a current carrying coil, the strength of the magnetic field increases.
36. The particle moves at a constant speed up to a time  $t_0$  and then stops.
37. Natural wool and natural silk are protein fibres.
38. In melting and beating no new substance forms.
39. Change in physical state is physical change.
40. Shearing is removal of fleece from the body.  
Small fluffy fibre present on the clothes are called burrs.  
Morus alba is a botanical name of mulberry plant.  
Cleaning of sheared skin is called scouring.
41. Magnesium hydroxide is antacid and sodium hydrogen carbonate is baking soda.
42. Methyl orange is an indicator. In acidic medium it turns to red.
43. Let  $x$  be subtracted from  $-3$  to get  $-9$   
 $\therefore -3 - x = -9$   
 $9 - 3 = x$   
 $6 = x$ .
44.  $\frac{16}{5} + \frac{21}{10} - \frac{3}{2} - \frac{1}{4}$   
 $= \frac{64 + 42 - 30 - 5}{20} = \frac{71}{20} = 3\frac{11}{20}$ .
45. Let  $3\angle A = 4\angle B = 6\angle C = x$   
 $\therefore \angle A = \frac{x}{3}, \angle B = \frac{x}{4}, \angle C = \frac{x}{6}$   
 $\Rightarrow \frac{x}{3} + \frac{x}{4} + \frac{x}{6} = 180^\circ$   
 $\Rightarrow \frac{4x + 3x + 2x}{12} = 180^\circ$   
 $\Rightarrow x = \frac{180^\circ \times 12}{9} = 240$   
 $\therefore A = \frac{240}{3} = 80^\circ$ .
46. As  $5 + 4 > CA$   
 and  $CA > 5 - 4$   
 $\therefore 1 \text{ cm} < CA < 9 \text{ cm}$ .
47. As  $\triangle ACB \cong \triangle ACH \cong \triangle BCH$

$$\begin{aligned} \Rightarrow \angle ACB &= \angle ACH = \angle BCH \\ \therefore \angle ACB + \angle ACH + \angle BCH &= 360^\circ \\ \therefore 3\angle BCH &= 360^\circ \\ \angle BCH &= 120^\circ. \end{aligned}$$

48. As  $\frac{2+3+x+7+8}{5} = x$

$$\begin{aligned} \Rightarrow 20 + x &= 5x \\ 4x &= 20 \\ x &= \frac{20}{4} = 5. \end{aligned}$$

49. As  $AB + BP > AP$  ... (1)  
and  $AC + CP > AP$  ... (2)  
Adding (1) and (2), we get  
 $AB + BC + CA > 2AP$ .

50.  $\angle 1 = 180^\circ - 100^\circ = 80^\circ$   
 $\angle 2 = 180^\circ - 110^\circ = 70^\circ$   
 $\therefore \angle AOC = \angle 1 + \angle 2 = 70^\circ + 80^\circ = 150^\circ$ .

