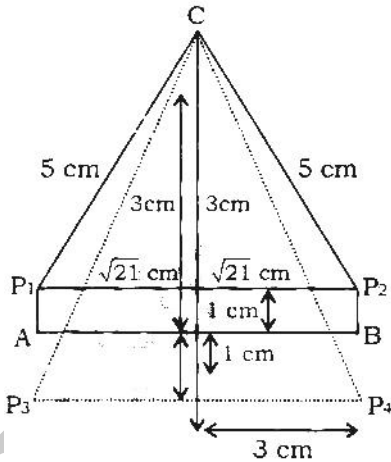
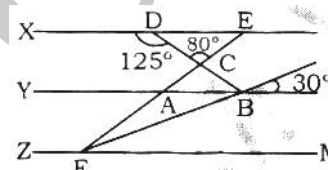


HINT & SOLUTIONS

1. (a) Let the measure of angle = x°
 \therefore Its supplement = $(180 - x)^\circ$
 $x = \frac{1}{3}(180 - x) \Rightarrow x = 45^\circ$
2. (d)
3. (b) Let $X < 90^\circ$ and other angle = y
 $\therefore X + Y = 180^\circ$ (linear pair)
 $\therefore Y = 180^\circ - X, \therefore Y > 90$
 $(\because X < 90^\circ)$

4. (a) $\angle BOP = 90^\circ - \angle AOB$
 $= 90^\circ - 20^\circ$
 $= 70^\circ$
 $\therefore \angle POQ = 90^\circ - \angle BOP$
 $= 90^\circ - 70^\circ$
 $= 20^\circ$
5. (b) $\angle PRQ + \angle QRS + \angle SRT = 180^\circ$
 $\therefore \angle PRQ + 80^\circ + \angle PRQ = 180$
 $(\therefore \angle PRQ = \angle SRT)$
 $\angle PRQ = 50^\circ$
 $\angle PQR = 180^\circ - \angle QPR - \angle PRQ$
 $= 180^\circ - 100^\circ - 50^\circ = 30^\circ$
6. (d) Required number of points = $4(P_1, P_2, P_3, P_4)$



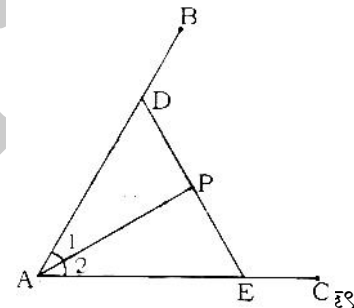
7. $\angle CDE = 180^\circ - 125^\circ = 55^\circ$
- 

In $\triangle DCE$,
 $\angle CED = 180^\circ - 55^\circ - 80^\circ = 45^\circ$
and $\angle ABF = 30^\circ$
(vertically opposite angle)

Also, $\angle ABF = \angle BFM = 30^\circ$
(Alternate angle)
and $\angle DEF = \angle EFM$
(Alternate angle)

$$\begin{aligned} \angle EFM &= 45^\circ \\ \angle EFB + \angle BFM &= 45^\circ \\ \angle EFB &= 45^\circ - 30^\circ \\ \angle AFB &= 15^\circ \end{aligned}$$

8. (a) $\frac{PD}{PE} = \frac{AD}{AE} = \frac{AP}{AP}$



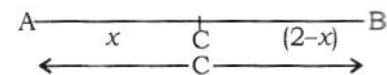
$\triangle DAP$ and $\triangle APE$ are similar

So, $\angle 1 = \angle 2$

AP is bisector of $\angle A$

Hence, the locus of P is the triangle bisector of angle A.

9. (b) Given, $AC^2 = AB \times CB$
 $x^2 = 2 \times (2 - x)$
 $x^2 = 4 - 2x$



$$x^2 + 2x - 4 = 0$$

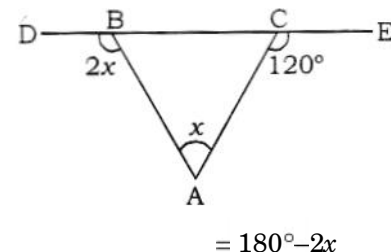
$$x = \frac{-2 \pm \sqrt{4 + 16}}{2 \times 1}$$

$$x = -1 \pm \sqrt{5}$$

$$= 3 - \sqrt{5}$$

(neglect $3 + \sqrt{5} \Rightarrow 3 + \sqrt{5} > 2$)

10. (d) $\angle ABC = 180^\circ - \angle DBA$



$$= 180^\circ - 2x$$

and $\angle ACB = 180^\circ - \angle ACE$
 $= 180^\circ - 120^\circ = 60^\circ$

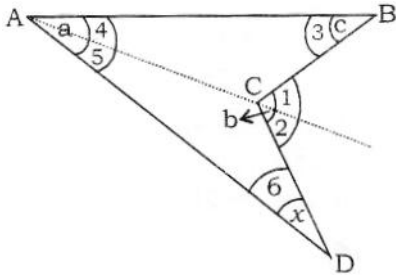
We know that,

$$\begin{aligned}\angle ABC + \angle ACB + \angle BAC &= 180^\circ \\ 180^\circ - 2x + 60^\circ + x &= 180^\circ \\ 240^\circ - 180^\circ &= x \\ x &= 60^\circ\end{aligned}$$

11. (a) $\angle 1 = \angle 3 + \angle 4$

$$\angle 2 = \angle 5 + \angle 6$$

(exterior angle is equal to sum of two opposite interior angles)



$$\begin{aligned}\angle 1 + \angle 2 &= \angle 3 + \angle 4 + \angle 5 + \\ \angle 6 &= b = c + a + x \\ x &= b - c - a\end{aligned}$$

12. (a) $\therefore GF \parallel HI$

$$\therefore \angle CHI = \angle FGC = 80^\circ$$

13. (b) $RS \parallel TU$

$$\therefore \angle XNR = \angle XZT = 130^\circ$$

(corresponding angles)

$$\therefore VW \parallel XY$$

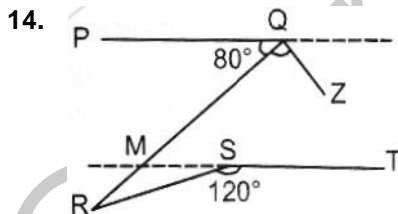
$$\therefore \angle OMR = \angle XNR = 130^\circ$$

(corresponding angles)

$$\therefore PQ \parallel RS$$

$$\therefore \angle VOP = \angle OMR = 130^\circ$$

(corresponding angles)



$$\begin{aligned}\angle MSR &= 180^\circ - \angle RST \\ &= 180^\circ - 120^\circ\end{aligned}$$

$$\therefore PQ \parallel ST$$

$$\therefore \angle RMS = 180^\circ - \angle QMS = 100^\circ$$

$$\angle SRM = 180^\circ - 100^\circ - 60^\circ = 20^\circ$$

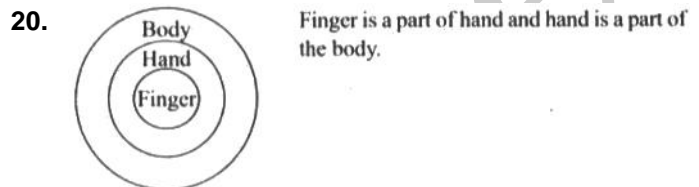
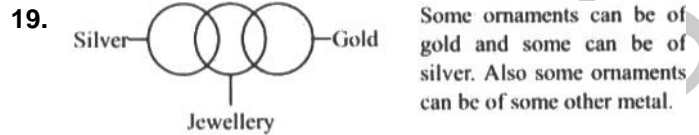
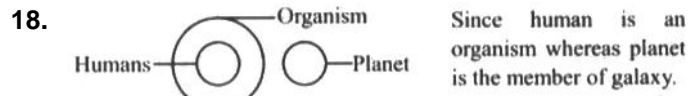
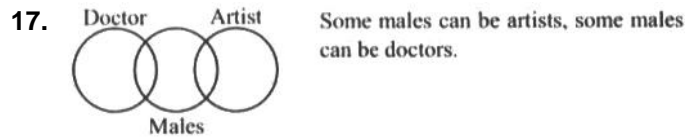
$$\therefore \angle RQZ = 2\angle QRS = 2\angle SRM$$

$$\therefore \angle RQZ = 2 \times 20^\circ = 40^\circ$$

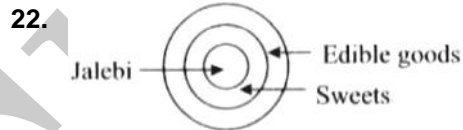
16.



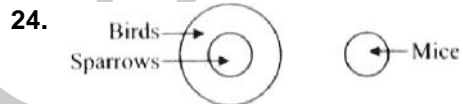
Since, physics and chemistry are two different subjects, but both lie within science.



21. Cement and wood both belong to building material but are different form each other.



23. Clearly, all three belong to different categories



25. Clearly, only A denotes those who are singers and dancers butnot college students.

26. Clearly, only E denotes the required persons.

27. C denotes such students who are dancers as well as singers as C is present in all three of them.

29. Clearly, G and D denotes such singers who are not dancers.

30. Number of those students who passed in at least two subjects

$$= 15 + 28 + 22 + 10 = 75$$

Hence, percentage of those students

$$= \frac{75}{600} \times 100 = 12.5\%$$

33. If you look closely, you will find that the center number can be obtained by multiplying the largest numbers on the corners and subtracting the smallest number from it.

$$26 = 7 * 5 - 3^2$$

In the same manner, every other figure follows. Thus the missing number:

$$9 * 5 - 4^2$$

$$= 45 - 16$$

$$= 29$$

34. 98.

$$\text{Explanation : } ab + a(a-1)$$

$$7 * 8 + 7(7 - 1)$$

$$= 56 + 42$$

35. L8

Explanation:

To know why, just read the number series upside down and you will find that the numbers are 91, 90, 89, 88, __, 86

So L8 when read upside down reads as 87.

36. The given sequence is a combination of two series :

I. 1st, 3rd, 5th, 7th, 9th, 11th terms i.e. A, B, C, D, E, ? II.

2nd, 4th, 6th, 8th, 10th terms i.e. B, D, F, H, ?

Clearly, I consists of consecutive letters while II consists of alternate letters. So, the missing letter in I is F, while that in II is J. So, the missing terms i.e. 10th and 11th terms are J and F respectively.

37. $Z \xrightarrow{-2} X \xrightarrow{-5} S \xrightarrow{-10} I \xrightarrow{-17} R \xrightarrow{-26} R \xrightarrow{-37} (G) \xrightarrow{-50} (I)$

Note that the numbers representing the difference between the consecutive terms of the series again from a series - 2, 5, 10, 17, 26, 37, 50 - in which the pattern is +3, +5, +7, +9, +11, +13.

38. 1st letter : $A \xrightarrow{+3} D \xrightarrow{+3} G \xrightarrow{+3} J \xrightarrow{+3} (M)$ 2nd letter : $Y \xrightarrow{-2} W \xrightarrow{-2} U \xrightarrow{-2} S \xrightarrow{-2} (Q)$ 3rd letter : $B \xrightarrow{+3} E \xrightarrow{+3} H \xrightarrow{+3} K \xrightarrow{+3} (N)$

39. Explanation:

 $T \xrightarrow{-2} R \xrightarrow{-2} P \xrightarrow{-2} N \xrightarrow{-2} L \xrightarrow{-2} (J) \xrightarrow{-2} (H)$
40. 1st letter : $P \xrightarrow{-1} O \xrightarrow{-1} N \xrightarrow{-1} M \xrightarrow{-1} (L)$ 2nd letter : $M \xrightarrow{+2} O \xrightarrow{+2} Q \xrightarrow{+2} S \xrightarrow{+2} (U)$ 3rd letter : $T \xrightarrow{-1} S \xrightarrow{-1} R \xrightarrow{-1} Q \xrightarrow{-1} (P)$

41. The given series may be divided into 2 groups :

I. A, B, C, D, E, F, ?, ? and II. N, O, P, ?

Clearly, the given series consists of two terms of I followed by one term of II.

The missing terms in I are G and H while the missing term in II is Q.

42. 1st letter : $G \xrightarrow{+3} J \xrightarrow{+4} N \xrightarrow{+5} S \xrightarrow{+6} Y \xrightarrow{+7} (F)$ 2nd letter : $H \xrightarrow{+4} L \xrightarrow{+5} Q \xrightarrow{+6} W \xrightarrow{+7} D \xrightarrow{+8} (L)$ 43. $R \xrightarrow{+3} U \xrightarrow{+3} X \xrightarrow{+3} A \xrightarrow{+3} D \xrightarrow{+3} G$ 44. 1st letter : $A \xrightarrow{+1} B \xrightarrow{+2} D \xrightarrow{+3} G \xrightarrow{+4} (K)$ 2nd letter : $Y \xrightarrow{-3} V \xrightarrow{-4} R \xrightarrow{-5} M \xrightarrow{-6} (G)$ 3rd letter : $D \xrightarrow{+2} F \xrightarrow{+2} H \xrightarrow{+2} J \xrightarrow{+2} (L)$ 45. 1st letter : $A \xrightarrow{+2} C \xrightarrow{+3} F \xrightarrow{+4} (J)$ 2nd letter : $Z \xrightarrow{-2} X \xrightarrow{-3} U \xrightarrow{-4} (Q)$

> ANSWER KEY

- | | | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a) | 2. (d) | 3. (b) | 4. (a) | 5. (b) | 6. (d) | 7. (b) | 8. (a) | 9. (b) | 10. (d) |
| 11. (a) | 12. (a) | 13. (b) | 14. (c) | 15. (d) | 16. (a) | 17. (d) | 18. (b) | 19. (d) | 20. (c) |
| 21. (b) | 22. (c) | 23. (c) | 24. (b) | 25. (b) | 26. (d) | 27. (c) | 28. (e) | 29. (e) | 30. (a) |
| 31. (c) | 32. (a) | 33. (a) | 34. (a) | 35. (a) | 36. (d) | 37. (a) | 38. (b) | 39. (b) | 40. (a) |
| 41. (c) | 42. (d) | 43. (b) | 44. (b) | 45. (c) | | | | | |