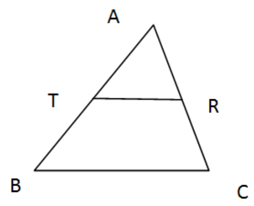
Answers & Explanations

1. Option: c)

If T and R are mid points of the sides AB and AC respectively in triangle ABC



The only option that is correct is TR will be parallel to BC.

2. Option: a)

We know that, the sides of a square are equal to each other. $P(2,3)$ and $R(6,3)$

$\therefore PR = RQ$

Distance between P and R is

$\sqrt{(2-6)^2 + (3-3)^2} = 4$

Since it is a square the x coordinate will be same only Y coordinates will change

Hence S will be (2,1) and R will be (6,1)

3. Option: b)

If coordinate of one end of the line is $(6,9)$

Then on y-axis the coordinate of x shall be 0

Hence the coordinate will be $(0, 9)$

4. Option: c)

$(3,6);\ (6,9); (9,18)$

The coordinate for centroid is

$\frac{x1+x2+x3}{3} = \frac{3+6+9}{3} = 6$

$\frac{y1+y2+y3}{3} = \frac{6+9+18}{3} = 11$

So coordinates are $(6, 11)$

5. Option: c)

The coordinate of the midpoint is

$X = \frac{x1+x2}{2} = \frac{4+6}{2} = 5$

$Y = \frac{y1+y2}{2} = \frac{5+7}{2} = 6$

$\rightarrow (5,6)$

6. Option: c)

$12cos^2\theta + 8sin^2\theta = 7$

$Now\ we\ know\ \left\{2sin^2\theta = \frac{1-cos^2\theta}{2}\right\}$

$12cos^2\theta + 2 - 2cos^2\theta = 7$

$10cos^2\theta = 5$

$Cos^2\theta = ½$

$2\theta = 60$

$\Theta = 30$

$tan30 = \frac{1}{\sqrt{3}}$

7. Option: c)

$\sec^2\theta = \frac{1}{\cos^2\theta}$

$tan^2\theta = \frac{sin^2\theta}{cos^2\theta}$

$\rightarrow\ tan^2\theta - sec^2\theta \ = \frac{-1(1-sin^2\theta)}{cos^2\theta}$

$\rightarrow \{since\ sin^2\theta + cos^2\theta = 1 \ \rightarrow\ \ 1 - sin^2\theta \ = \ cos^2\theta\}$

$\rightarrow\ tan^2\theta - sec^2\theta \ = \frac{-cos^2\theta}{cos^2\theta} \ = \ -1$

8. Option: b)

$tan\ 30 \ = \ \frac{1}{\sqrt{3}} \ = 0.577$

$\frac{sin60}{1+cos60} \ = \ \frac{\sqrt{3}/2}{1+1/2} \ = \ \frac{\sqrt{3}/2}{3/2} \ = \ \frac{1}{\sqrt{3}} \ = \ 0.577$

$\left\{since\ tan\frac{\theta}{2} \ = \ \frac{\sin\theta}{1+cos\theta}\right\}$

9. Option: b)

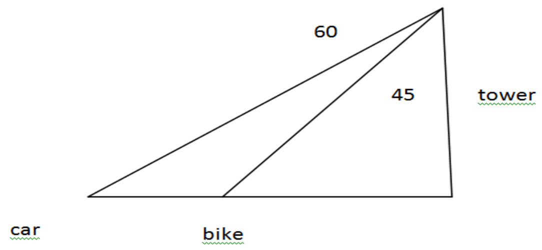
$cos^2 60 - \ sin^2 45 \ = \ x\ cos\ 30$

$\frac{1}{4} - \frac{1}{2} \ = \ \frac{3x}{4}$

$\frac{-1}{2} \ = \ \frac{3x}{4}$

$x \ = \ \frac{-2}{3}$

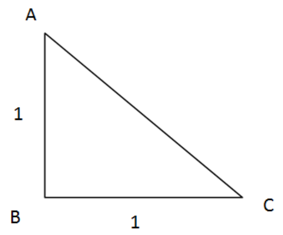
10. Option: a)



From the above figure we can say that car is farther than the bike.

11. Option: d)

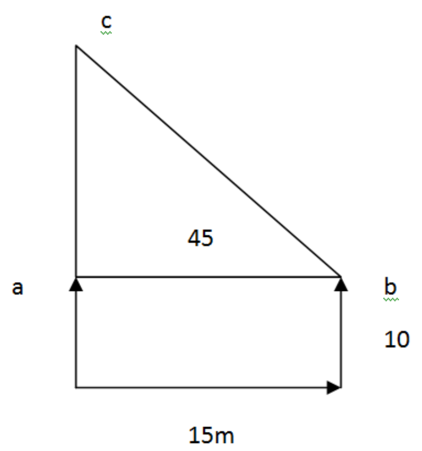
Let us assume the equal sides of the triangle be 1



$AB^2 + BC^2 = AC^2$

$1^2 + 1^2 = AC^2 \rightarrow AC = \sqrt{1} + 1 = \sqrt{2}$

12. Option: d)



$tan45 = \frac{ac}{ab} = 1 = \frac{ac}{15} \rightarrow ac = 15$

Total height of building $= ac + 10 = 25$

13. Option: c)

Area of triangle using heron's formula is

$S = \frac{a+b+c}{2} = 13$

$Area = \sqrt{s(s-a)(s-b)(s-c)}$

$\rightarrow \sqrt{13(13-10)(13-12)(13-4)}$

$\rightarrow \sqrt{13 \times 3 \times 1 \times 9}$

$\rightarrow 3\sqrt{39}$

14. Option: b)

Coordinates $(0,8)$ and $(7,1)$

$D = \sqrt{(x1-x2)^2 + (y1+y2)^2}$

$\rightarrow \sqrt{(7-0)^2 + (1-8)^2} \rightarrow 7\sqrt{2}$

15. Option: c)

$l = \frac{\theta}{360} 2\pi r$

$\rightarrow 22 = \frac{60}{360} 2 \times \frac{22}{7} \times r$

$\rightarrow R = 21cm$

16. Option: a)

$circumference = 2\pi r$

$Length\ of\ arc = 2\pi r \times \frac{1}{4} = \frac{\pi r}{2}$

$\frac{\pi r}{2} = \frac{\theta}{360} \times 2\pi r$

$\rightarrow \theta = 90$

17. Option: b)

$reduced\ radius\ = \frac{9}{10}r$

$\rightarrow\ Area\ = \pi r^2$

$\rightarrow\ New\ area\ = \pi\ \times \frac{9}{10}r \times \frac{9}{10}r$

$\rightarrow \frac{81}{100}\pi r^2$

81% of original area

18. Option: d)

A chord of a circle divides the circle into two regions, which are called the segments. The region bounded by the chord and the minor arc intercepted by the chord is minor segment

19. Option: d)

Surface area of cylinder = $2\pi rh\ +\ 2\pi r^2$

$h =\ 2r$

$\rightarrow\ 6\pi = 6\pi r^2$

$\rightarrow\ R = 1$

$\rightarrow\ H =\ 2$

20. Option: c)

$CSA\ of\ cone\ = \pi rl$

$R =\ 9$

$135\pi = \pi 9L$

$\rightarrow\ L\ =\ 15cm$

$\rightarrow\ H\ = \sqrt{}(L^2 - r^2)$

$\rightarrow\ H = \sqrt{15^2 - 9^2}$

$\rightarrow\ H = 12\ cm$

21. Option: d)

Volume of a sphere $= \frac{4}{3}\pi r^3$

$38808\ = \frac{4\times 22}{3\times 7} r^3$

$r^3 =\ 9261$

$r\ =\ 21$

$d =\ 2r$

$d = 42$

22. Option: b)

Area of bigger cylinder = T

Area of one side of cube is included on area of bigger cylinder hence the area of cube to be added will be 6U-U = 5U

Now side of cube has base of smaller cylinder included on it hence –V

CSA of smaller cylinder = X

CSA of cone = W

Base of cone and cylinder coincide and don't include = -V

Total $=\ T + 5U - V + X + W - V$

$\rightarrow\ T + 5U - 2V + X + W$

23. Option: b)

Median = perpendicular corresponding 17

→ Median = 19

$\rightarrow$ Marks scored $= \frac{19}{50} \times 100$

$\rightarrow\ \% \ =\ 38\%$

24. Option: c)

If $F + Z\ =\ 34$ and $F - Z\ =\ 4$

Adding both

$2F\ =\ 38$

$F = 19$

25. Option: b)

5,6,4,7,6,8,4,6,5,9,6

In the above readings the highest number of occurrences is of no. 6

That is four times.

26. Option: d)

Number of violet balls $=\ 150$

Total $=\ 950$

Probability$= \frac{150}{950}\ =\ \frac{3}{19}$

27. Option: b)

Let face of card be F and back of card be B

Then occurrences can be

FFF

FFB

FBF

BFF

FBB

BFB

BBF

BBB

SO ATLEAST two face card options are $\frac{4}{8} = \frac{1}{2}$

28. Option: a)

If an odd integer X is taken; then $X(X+2)$ will be always odd

$For\ ex. X = 3\ ;\ then\ X(X+2) = 15\ (odd)$

$If\ X = 7;\ then\ X(X+2) = \ 63\ (odd)$

29. Option: c)

The decimal expansion of $\frac{1}{28}$ upto fifth place will be 0.03571

30. Option: a)

$5x^2 - 3x - 2d$

$A + B = -\ \frac{3}{8}\ (AB)$

$A = \frac{-b+\sqrt{b^2}-4ac}{2a} = \frac{3+\sqrt{9}-40d}{10}$

$B = \frac{-b-\sqrt{b^2}-4ac}{2a} = \frac{3-\sqrt{9}-40d}{10}$

$A + B = \frac{3+\sqrt{9}-40d}{10} + \frac{3-\sqrt{9}-40d}{10} = \frac{3}{5}$

$-\ \frac{3}{8}\ (AB)\ = -\ \frac{3}{8}\ x\ (\frac{3+\sqrt{9}-40d}{10}\ x\ \frac{3-\sqrt{9}-40d}{10})$

$\rightarrow \frac{3}{5} = -\ \frac{3}{8}\ (\frac{9-(9-40d)}{100})$

$\rightarrow\ -\frac{8}{5} = \frac{4d}{10} \rightarrow\ d\ =\ -4$

31. Option: c)

$(x^2 - 3)(x + x^2 + x\verb|^|3 + 4)(x^2 + 1)$

$(X^3 + x^4 + x^5 + 4x^2\ - 3x - 3x^2 - 3x^3 - 12)(x^2 + 1)$

$\rightarrow\ X^5 + x^6 + x^7 + 4x^4\ - 3x^3 - 3x^4 - 3x^5 - 12x^2 +\ X^3 + x^4 + x^5 + 4x^2\ - 3x - 3x^2 - 3x^3 - 12$

Highest order is 7

32. Option: a)

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

$Hence\ the\ order\ of\ eq\ is\ 4$

$X^2(x^2 - 1) = 0$

$X^2\ =\ 0$

$X = 0$

$X^2\ =\ 1$

$X = 1 \rightarrow\ \ x =\ 0{,}1$

$So\ 2\ roots$

33. Option: b)

$XY\ +\ YZ\ +\ ZX\ = \frac{c}{a}$

$XYZ\ =\ -\frac{d}{a}$

$\frac{1}{X} + \frac{1}{Y} + \frac{1}{Z}$

$= \frac{(\,YZ + XZ + XY\,)}{(\,XYZ\,)}$

$= \frac{\left(\frac{c}{a}\right)}{-\frac{d}{a}}$

$= -\frac{c}{d}$

$\frac{1}{\frac{1}{X}+\frac{1}{Y}+\frac{1}{z}} = \frac{1}{-\frac{c}{d}}$

$\rightarrow -\frac{d}{c}$

34. Option: b)

$\frac{x}{7} + \frac{y}{3} = \frac{6}{7}$

Multiplying both sides by 21 we get

$3x + 7y = 18$

$\rightarrow 3x + 7y - 18 = 0$

35. Option: c)

Digit at hundred's place = 3

Let digit at one's place be a

Then at ten's place it will be $\frac{a}{2}$

$3 + \frac{a}{2} + a = 15$

$\rightarrow 3 + \frac{3a}{2} = 15$

$\rightarrow a = 8$

$\rightarrow \frac{a}{2} = 4$

$\rightarrow number\ is\ 348$

36. Option: c)

$3x + 2y + 9 = 0\ and\ 2x + ky + 4 = 0$

$a1 = 3, b1 = 6, c1 = 9$

$a2 = 2;\ b2 = 4; c2 = k$

condition for not intersecting

$\rightarrow \frac{a1}{a2} = \frac{b1}{b2}$

$\rightarrow \frac{3}{2} = \frac{6}{k}$

$\rightarrow K = 4$

→ When k is 4 the lines will not intersect each other

37. Option: b)

$3x + 2y = 1 \, and \, 5x + 6y = 3$

In first equation

$X = 0$

$Y = \frac{1}{2}$

$So \left(0, \frac{1}{2}\right)$

In second equation

$X = 0$

$Y = \frac{3}{6} = \frac{1}{2}$

So point of intersection is (0, ½)

38. Option: a)

$4x^2 + 5x - 9 = 0$

$\rightarrow 4x^2 + 9x - 4x - 9 = 0$

$\rightarrow \left(x + \frac{9}{4}\right) (x - 1) =$

$\rightarrow x = -\frac{9}{4}, 1$

39. Option: b)

Indiscriminant = $\sqrt{b^2 - 4ac}$

$X^2 + kx - 9 = 0\ is\ 8$

$\rightarrow \sqrt{k^2 - 36} = 8$

$\rightarrow k^2 - 36 = 64$

$\rightarrow k = 10$

40. Option: b)

$6x^2 + 13x + 6 = 0$

For the above equation $\sqrt{b^2 - 4ac} = \sqrt{169 - 144} = 5$

So roots will be $-13 - 5 = -18$

And $-13 + 5 = -8$

Hence the roots are not equal, discriminant is not 0 and roots are not imaginary

Option b is correct.

41. Option: b)

$x^2 + \frac{2}{3}x + \frac{1}{9}$

$x^2 + \frac{1}{3}x + \frac{1}{3}x + \frac{1}{9}$

$\left(x + \frac{1}{3}\right)\left(x + \frac{1}{3}\right)$

$x = -\frac{1}{3}$

42. Option: b)

Each number is repeated twice hence there two rows of same no.

If there are 16 rows the lowermost row will have $\frac{16}{2} = 8$ blocks

So total number of blocks $= 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 5 + 5 + 6 + 6 + 7 + 7 + 8 + 8 = 72$

43. Option: d)

The given equation becomes $x^2 = b(b + 1)$

$\rightarrow\ x = \sqrt{b(b+1)}$

→ Hence x might not be a whole numbers

→ So option D is correct

44. Option: b)
If 3 floors have 90 steps then each floor has 30 steps
So 7 floors will have 210 steps
Each step is 15 cm in length then 210 steps will be 210x15 cm high
→ 3150 cm
→ 31.5m

45. Option: c)

$4k - 5, 7k, 10k + 5$

Are in AP

$T_n = a + (n-1)\,d$

$10k + 5 = 4k - 5 + 40$

$\rightarrow\ 6k = 40 - 10 = 30$

$\rightarrow\ k = 5$

46. Option: b)

$\frac{AL}{AB} = \frac{5cm}{8cm} = \frac{LM}{BC}$

$\rightarrow\ LM = \frac{AL \times BC}{AB}$

$\rightarrow\ LM = \frac{5\times16}{8} = 10cm$

47. Option: a)
Since both are isosceles triangles and similar

Hence angle ABC= angle ACB= angle DEF=angle DFE

Hence option A is correct

48. Option: c)

$PQ^2 = 4^2 + 4^2$

$\rightarrow PQ = \sqrt{2 \times 16}$

$\rightarrow PQ = 4\sqrt{2}$

49. Option: a)

Either of the four criteria is needed to prove two triangles are similar

50. Option: b)

Criteria for right angled triangle

$HYP^2 = B^2 + H^2$

So except A all others fulfill the criteria hence option b

(Part – B)

1. The diagonals are perpendicular to each other.

$\left(\frac{5+\sqrt{2}}{4}\right)^2 + \left(\frac{5-\sqrt{2}}{4}\right)^2 = side^2$

$\rightarrow \frac{25+2+10\sqrt{2}+25+2-10\sqrt{2}}{16} = side^2$

$\rightarrow \sqrt{\frac{54}{16}} = side$

$\rightarrow \left(\frac{3\sqrt{6}}{4}\right) = side$

2. $2x + 4 \;)\; 8x^3 + 9x^2 + 30x + 88 \;(\; 4x^2 - \frac{7}{2}x + 22$

$8x^3 + 16x^2$

— — — — — — — — — — — —

$-7x^2 + 30x$

$-7x^2 - 14x$

$44x + 88$

$44x + 88$

0

3. Let length of $RQ\ be\ x$ and length of $TR\ and\ TQ$ be y{ by perpendicular bisector theorem}

$\rightarrow X + 8 = y \rightarrow 1$

$\rightarrow X + y + y = 64$

$\rightarrow X + 2y = 64$

→ Substituting value we get

$\rightarrow Y = \frac{72}{3} = 24$

$\rightarrow X = 16$

4. $a = 29$

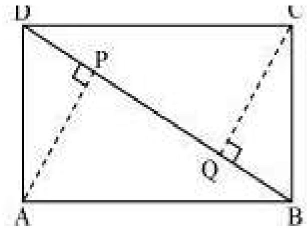
$D = 17$

$N = 6$

$Sn = \frac{n}{2}\{2a + (n-1)d\}$

$Total\ score = Sn = 3\{58 + 85\} = 429$

5.



The triangles $\Delta APB\ and\ \Delta CQD$

$AB = CD$

$\angle P = \angle Q = 90$(interior Alternate angles of AB||CD)

So $QD = PB$

Also triangle DPA and triangle CQB are congruent

Since $AD = BC$

Angle $APD = CQB = 90$

Angle $ADP = CBQ$ [interior alternate angles]

Hence by aas they are congruent

Now since these triangles are congruent

$DP = QB = 3CM$

$PQ\ =\ BD - QB - PD =\ 15 - 3 - 3 = 9$

$QD + PB\ =\ PQ + PD + PQ + QB =\ 24cm$

6. $P\ (6,5)\ Q\ (4,8)\ R\ (6,2)$

$PQ =\ 2;\ RQ = 6;\ PR = 4$

Perimeter

$X - coordinate$

$\rightarrow \frac{2x6+6x4+4x6}{12}\ =\ 5$

$Y - coordinate$

$\rightarrow \frac{2\times20+6\times10+4\times2}{12}\ =\ 9$

Incenter = (5,9)

7. $4sin^2 50 + 8sec^2 20 + 5\,cot^2 45 + 4cos^2 50 - 8tan^2 20 - 5cosec^2 45$

$\rightarrow (4sin^2 50 + 4cos^2 50) + (8sec^2 20 - 8tan^2 20) + (5\,cot^2 45 - 5cosec^2 45)$

$\rightarrow \{sin^2\theta + cos^2\theta = 1\}; \{sec^2\theta - tan^2\theta\}; \{cot^2\theta - cosec^2\theta\}$

$\rightarrow 4(1) + 8(1) + 5(1)$

$\rightarrow 17$

OR

$tan\ P = \frac{perp}{base} = \frac{4}{5}$

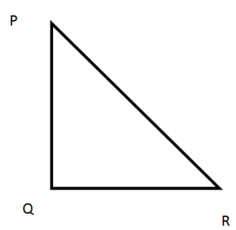
$Perpendicular^2 + base^2 = hyp^2$

$Hyp = \sqrt{4^2 + 5^2} = \sqrt{16 + 25} = \sqrt{41}$

$sinP = \frac{PQ}{PR} = \frac{4}{\sqrt{41}}$

$sin\ R = \frac{QR}{PR}$

$= \frac{5}{\sqrt{41}}$



8. 34, 55, 48, 61, 50, 49, 60

The above are the scores in matches

$Mean = \frac{\sum sum\ of\ frequency}{\sum frequency} = \frac{34+55+48+61+50+49+60}{7} = 51$

SECTION – B

9. Let total marks be x

$\frac{1}{5}x \ + \frac{1}{4}x = 36$

$x = 36 \times \frac{20}{9} = 80$

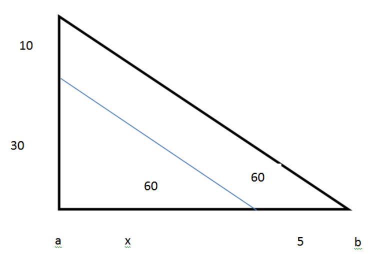
$50\% \ of \ 80 = 40$

Minimum marks to pass is 40 i.e. the marks scored in hindi

Marks in English $= 10 + 40 = 50$

10. From the below diagram all the given information is clear.

We have to find value of ab



$Ab = x + 5$

$tan\ 60 = \frac{40}{x+5}$

Also $tan\ 60 = \frac{30}{x}$

Equating both

$\frac{40}{x+5} = \frac{30}{x}$

$30x + 150 = 40x$

$\rightarrow 10x = 150$

$\rightarrow x = 15$

$So\ ab\ =\ x + 5\ =\ 15 + 5 = 20$

11. $Mid\ range\ = \frac{1}{2}\ (upper\ limit\ +\ lower\ limit)$

Range	10-20	20-30	30-40	40-50	50-60	
Mid range	15	25	35	45	55	
frequency	7	8	x	6	5	

$\Sigma fx\ =\ 15 \times 7 + 25 \times 8 + 35 \times x + 45 \times 6 + 55 \times 5 = 850 + 35x$

$\Sigma f\ =\ 7 + 8 + x + 6 + 5 =\ 26 + x$

$\frac{850+35x}{26+x}\ =\ 33$

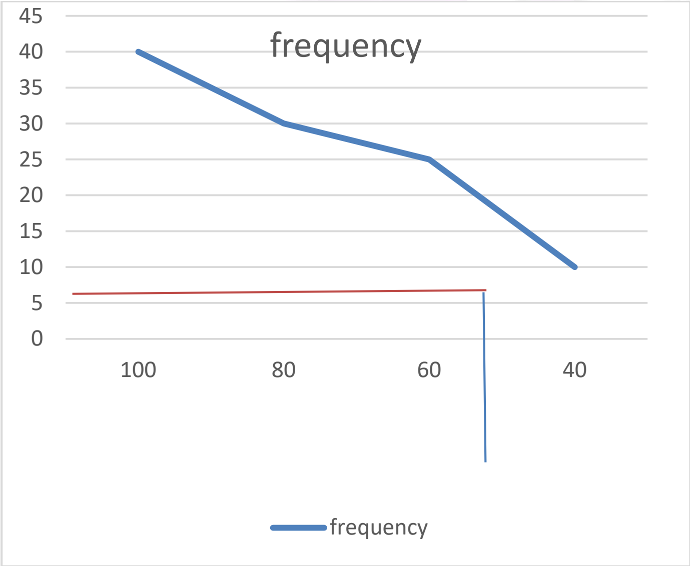
$858 + 33x = 850 + 35x$

$2x = 8$

$x = 4$

OR

Less than	100	80	60	40
frequency	40	30	25	10



$N\ =\ 40$

$\frac{N}{2} = 20$

Value corresponding $20\ is\ \approx\ 55$

12.

H	H	H	H
H	H	H	T
H	H	T	H
H	H	T	T
H	T	H	H
H	T	H	T
H	T	T	H
H	T	T	T
T	H	H	H
T	H	H	T
T	H	T	H
T	H	T	T
T	T	H	H
T	T	H	T
T	T	T	H
T	T	T	T

Only 2 heads $= \frac{6}{16} = \frac{3}{8}$

Only 3 tails $= \frac{4}{16} = \frac{1}{4}$

SECTION – C

13. Applying Pythagoras

$PQ^2 + RQ^2 = PR^2$

$PR = 20CM$

Let radius is "r"

$In\ LOMQ,$

Angle $Q = 90$ {right angled triangle}

Angle $M = 90$ {radius is perpendicular to tangent}

$OL = OM = r$

$QM = QL$ {Tangents from same point on a circle are equal in length}

Hence it's a square

$\rightarrow\ OL = OM = QM = QL = r$

SIMIARLY $RN\ = RL${tangents from same point on a circle are equal in length}

$\rightarrow\ RN\ =\ 12 - r$

Similarly $PM = PN$ {tangents from same point on a circle are equal in length}

$PN\ =\ 16 - r$

$PN + RN\ =\ 28\ - 2r$

$PR\ = 20\ =\ 28 - 2r$

$R = 4$

14. Area of room = $\frac{22}{7}\ \times\ 42 \times\ 42\ \times\ \frac{\theta}{360}$

$\rightarrow \frac{22}{7} \times\ 42\ \times\ 42\ \times \frac{60}{360}\ =\ 924\, m^2$

$\rightarrow$ $if\ one$ needs 1.2 m^2 area 924 will need = $\frac{924}{1.2}\ =\ 770\, people$

$\rightarrow cost\ of\ lighting\ boundary\ =\ rupees\ 50$

$\rightarrow perimeter = 2 \times \frac{22}{7} \times 42 \times \frac{60}{360}\ =\ 44$

$\rightarrow total\ cost = 44\ x\ 50 = 2200$

15. Volume of cone = $\frac{1}{3}$ лr2h

$\rightarrow$Volume of bigger cone = $\frac{1\times22\times35\ \times35\ \times18}{3\times7}\ =\ 23100$

$\rightarrow$Volume of cylinder = $\pi r^2 h\ =\ 22 \times 14 \times 14 \times \frac{12}{7}\ =\ 7392$

$\rightarrow$Remaining volume = $15708\ cm^3$

Volume of smaller cone = $\frac{1}{3}\ \pi r^2 h$

$\frac{1 \times 22 \times 14 \times 14 \times 12}{3 \times 7} = 2464$

$= 15708 - 2464 = 13244$

OR

Volume of cylinder = $\pi r^2 h = 22 \times 12 \times 12 \times \frac{21}{7} = 9504$

Volume of hemisphere = $\left(\frac{2}{3}\right) \pi r^3$

Volume = $\frac{2 \times 22 \times 12 \times 12 \times 12}{3 \times 7} = 3620.5$

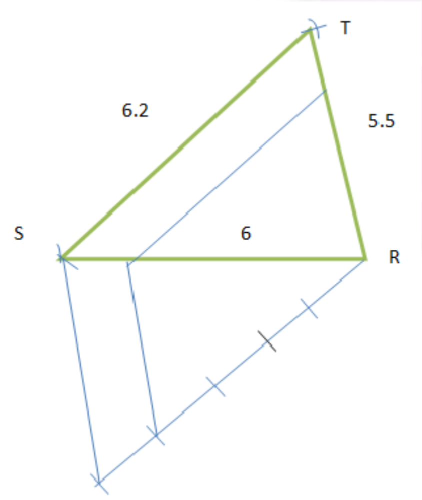
So vol of both = $2 \times 3620.5 = 7241$

$Remaning\ vol = volume\ of\ cylinder - 2 \times Volume\ of\ hemisphere$

Vol = $9504 - 7241 = 2263$

SECTION – D

16.



Steps of construction

a) From R cut an arc S of 6cm and draw SR of 6cm similarly draw RT of 5.5cm and make triangle SRT.

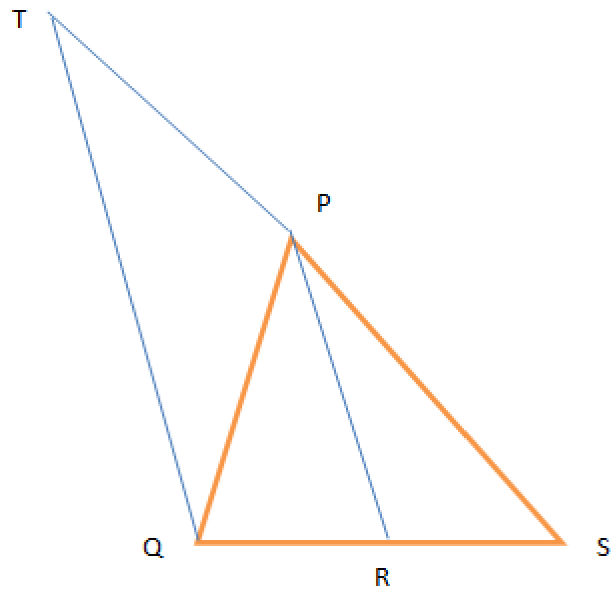
b) Make a line from R and cut 5 arcs

c) Join fifth arc to S and from fourth arc draw a line parallel from previous line

d) From this point draw a line parallel to ST.

e) The triangle thus constructed will be $\frac{4}{5}$ th of original

17.



$\frac{QR}{RS} = \frac{PQ}{PS}$ {given}

let angle $RPQ = 1$ and angle $RPS = 2$

LET angle $PQT = 3$; $PTQ = 4$

PR parallel QT {construction}

$2 = 4 \{ PR \backslash\backslash QT\} \rightarrow a$

$1 = 3$ { interior alternate}→b

Also $\frac{QR}{SR} = \frac{TP}{SP}$ { side splitter theorm}

$\rightarrow PT = PQ$

$\rightarrow Angle\ 3 = 4$

$\rightarrow FROM\ a\ and\ b$

$\rightarrow We\ get\ 1 = 2$

Hence PR bisects angle P

OR

In a quadrilateral

Angle $(M + N + O + P) = 360$

$\rightarrow M + N + 65 + 95 = 360$

$\rightarrow M + N = 200$

$\rightarrow \frac{1}{2}(M + N) = 100$

$\frac{1}{2} M = angle\ OMN$

$\frac{1}{2} N = angle\ ONM$

Now in triangle OMN,

$Angle\ o + angle\ ONM + angle\ OMN = 180$ {sum of angles of triangle}

$\rightarrow Angle\ o + \frac{1}{2}(M + N) = 180$

$\rightarrow angle\ o = 80$