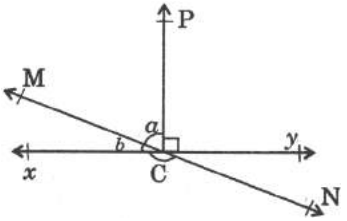
SECTION - I
Straight Objective Type

1. $a:b=2:3$

Let $a=2x, b=3x$



$a+b=90^\circ$

$\Rightarrow \quad 2x+3x=90^\circ$

$\Rightarrow \quad 5x^\circ=90^\circ$

$\Rightarrow \quad x^\circ=18^\circ$

$\Rightarrow \quad a=36^\circ$ and $b=54^\circ$

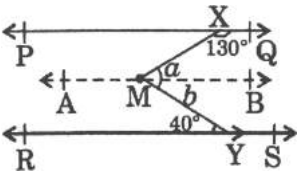
$\angle b+\angle c=180^\circ$ ($\because$ linear pair)

$\Rightarrow \quad 54^\circ+\angle c=180^\circ$

$\angle c=180^\circ-54^\circ=136^\circ$

Hence (c) is the correct option.

2.



$\overline{AB} \parallel \overline{PQ}$

$\Rightarrow \quad \angle a+135^\circ=180^\circ$

($\because$ cointerior angles)

$\Rightarrow \quad \angle a=180^\circ-135^\circ$

$\overline{AB} \parallel \overline{RS}$

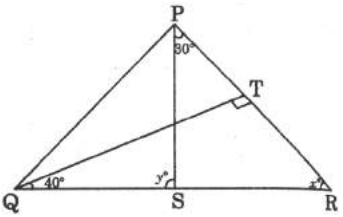
$\Rightarrow$ $\underline{|b^\circ = 40^\circ}$

($\because$ alterate angles)

$\underline{|XMY} = a^\circ + b^\circ = 45^\circ + 40^\circ = 85^\circ$

Hence (d) is the correct option.

3.



ΔQTR

$90^\circ + 40^\circ + x^\circ = 180^\circ$

$\Rightarrow$ $x^\circ = 180^\circ - 130^\circ = 50^\circ$

ΔPSR

$30^\circ + x^\circ = y^\circ$

($\because$ y° exterior angle and $30^\circ, x^\circ$ are it's interior opposite angles)

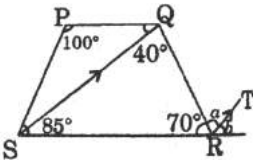
$\Rightarrow$ $y^\circ = 80^\circ$

The value of $x + y = 50^\circ + 80^\circ$

$= 130^\circ$

Hence (c) is the correct option.

4.



ΔPQS

$100^\circ + 40^\circ + \underline{|PSQ}$

$= 85^\circ - 40^\circ$

$= 45^\circ$

ΔQRS

$\angle SQR + 85^\circ + 70^\circ = 180^\circ$

$\Rightarrow \quad \angle SQR = 180^\circ - 155^\circ$

$= 45^\circ$

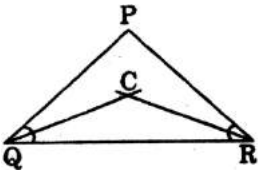
$SQ \parallel RT$

$\Rightarrow \quad \angle SQR = \angle QRT = 45^\circ$

(alterate angles)

Hence (a) is the correct option.

5.



$\angle QCR = 90^\circ + \frac{\angle P}{2}$

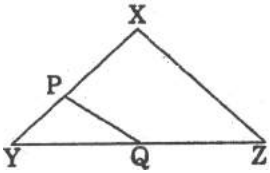
$= 90^\circ + \frac{70^\circ}{2}$

$= 90^\circ + 35^\circ$

$= 125^\circ$

Hence (b) is the correct option.

6.



$XP = 2PY$

$YQ = 2QZ$

$\Rightarrow \quad \frac{XP}{PY} = \frac{YQ}{QZ} = 2$

$\Rightarrow$ $PQ \| XZ$

($\because$ converse of Basic proportionality theorem)

$\Delta YPQ \sim \Delta XYZ$

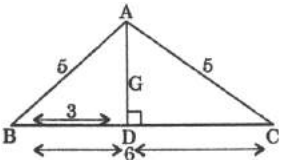
$\Rightarrow$ Area of ΔYPQ : Area of ΔXYZ

$\Rightarrow$ $\frac{PQ^2}{XZ^2} = \frac{2^2}{3^2} = \frac{4}{9}$

$\left(\because \frac{PQ}{XZ} = \frac{2}{3}\right)$

Hence (a) is the correct option.

7.



$AB = AC = 5, BC = 6$

$\Rightarrow$ $AD = \sqrt{5^2 - 3^2}$

$= 4$

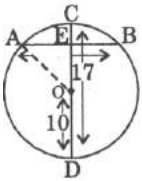
$AD : GD = 2 : 1$

$AG = 4 \times \frac{2}{3} = \frac{8}{3}$

Since centroid G devides the medium in the ratio 2 : 1

Hence (d) is the correct option.

8.



$OE \perp AB$

$\Rightarrow$ $AE = EB = \frac{1}{2}(16)$

$=8cm$

($\because$ The perpendicular drawn from the centre to a chord bisets the chord)

$OA=10cm$

($\because$ OA is radius)

ΔOAE

$OE^2=OA^2-AE^2$

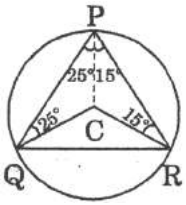
$=10^2-8^2$

$=6^2$

$\Rightarrow \quad OE=6cm$

Hence (d) is the correct option.

9.



$QC=PC$

($\because$ radii)

$\Rightarrow \quad \angle PRC=\angle RPC=25^\circ$

$\Rightarrow \quad \angle QCR=2\times 40^\circ=80^\circ$

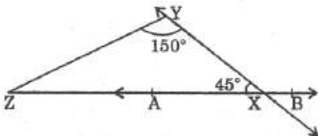
$\Rightarrow \quad \angle QPR=25^\circ+15^\circ=40^\circ$

$\Rightarrow \quad \angle QCR=2\angle QPR$

$=2\times 40^\circ=80^\circ$

Hence (c) is the correct option.

10.

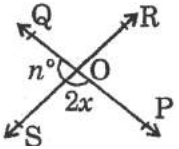


$\angle AXZ =$

$\angle AXZ = 165$

Hence (d) is the correct option.

11.



$\angle POS = 2\angle SOQ$

Let $\angle SOQ = x$

$\Rightarrow$ $\angle POS = 2x$

$\angle SOQ + \angle POS = 180^\circ$

$\Rightarrow$ $x^\circ + 2x^\circ = 180^\circ$

$\Rightarrow$ $3x^\circ = 180^\circ$

$\angle SOQ = \angle POR = x^\circ = 60^\circ \; x^\circ = 60^\circ$

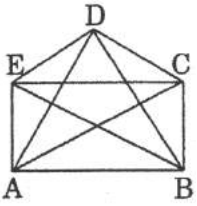
$\angle POS = \angle POQ = 2x^\circ = 120^\circ$

$\Rightarrow$ The four angles at 'O' are

$60^\circ, 60^\circ, 120^\circ, 120^\circ$

Hence (b) is the correct option.

12.

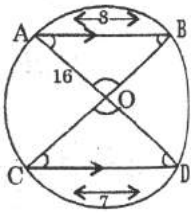


A B C D E is a regular Pentagon.

Alternative vertices are joined to make a five pointed star A B C D E. The sum of 5 vertical angles of this star is 180°

Hence (b) is the correct option.

13.



$\Delta AOB \sim \Delta BOC$

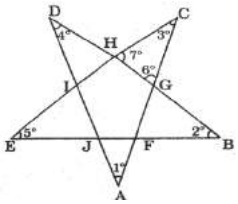
$\Rightarrow \quad \frac{AB}{CD} = \frac{OA}{OD}$

$\Rightarrow \quad OD = \frac{OA \times CD}{AB}$

$= \frac{16 \times 7}{8} = 14cm$

Hence (a) is the correct option.

14.



ΔCHG

$\underline{|}3 + \underline{|}6 + \underline{|}7 = 180^\circ$

($\because$ Sum of three angles of a Δ is 180°)

$\underline{|}6 = \underline{|}1 + \underline{|}4$

$\underline{|}7 = \underline{|}2 + \underline{|}5$

$\Rightarrow \quad \underline{|}3 + \underline{|}1 + 4 + \underline{|}2 + \underline{|}5 = 180^\circ$

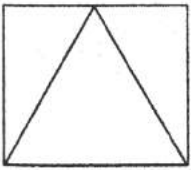
$\Rightarrow \quad \underline{|}3 + \underline{|}1 + \underline{|}4 + \underline{|}5 = 180^\circ$

$\Rightarrow \quad \underline{|}1 + \underline{|}2 + \underline{|}3 + \underline{|}4 + \underline{|}5 = 180^\circ$

$\Rightarrow \quad \underline{|}A + \underline{|}B + \underline{|}C + \underline{|}D + \underline{|}E = 180^\circ$

Hence (b) is the correct option.

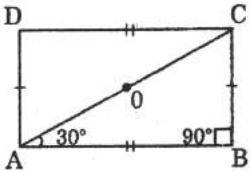
15.



$l_2 = \frac{l_1}{\sqrt{3}}$

Hence (d) is the correct option.

16.



In ΔABC

$Sin30^\circ = \frac{BC}{AC}$

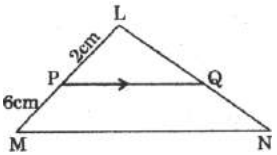
$\frac{1}{2} = \frac{BC}{2.OA}$

$\Rightarrow \quad BC = OA$

Radius of the circle = BC

Hence (b) is the correct option.

17.



$PQ \| MN$

$\Rightarrow \quad \frac{\lfloor P}{PM} = \frac{PQ}{MN}$

(∵ Basic Proportionality Theorum)

$$\frac{2}{6}=\frac{PQ}{20}$$

$$\Rightarrow \quad PQ=\frac{2}{8}\times 20=\frac{20}{4}=5cm$$

$$\frac{\text{Area of Trapezium P Q N M}}{\text{Area of } \Delta LPQ}$$

$$=\frac{\text{Area of } \Delta LMN - \text{Area of } \Delta \text{ LPQ}}{\text{Area of } \Delta LPQ}$$

$$=\frac{\text{Area of } \Delta LMN}{\text{Area of } \Delta LPQ}-1$$

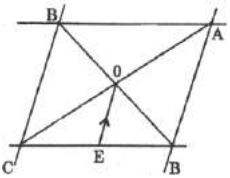
$$=\frac{20^2}{5^2}-1$$

$$=\frac{400}{25}-1$$

$$=15-1=14cm$$

Hence (b) is the correct option.

18.



$$=\frac{\text{Area of } (\Delta CEO)}{\text{Area of } (\text{parallelogram A B C D})}$$

Area of C B D

$$=\frac{1}{2}(\text{Area of parallelo gram A B C D})$$

Area of COB$=\frac{1}{2}(\text{Area of } \Delta CBD)$

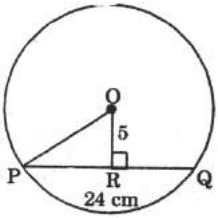
Area of $\Delta CEO = \frac{1}{2}(\text{Area of } \Delta COB)$

$\Rightarrow$ Area of

$\Delta CEO = \frac{1}{8}(\text{Area of paralleo gram A B C D})$

$\Rightarrow$ Hence (a) is the correct option.

19.



$OR \perp PQ$

$\Rightarrow$ $PR = \frac{1}{2}PQ$

$= \frac{1}{2}(24)$

$= 12cm$

ΔOPR

$OP^2 = OR^2 + PR^2$

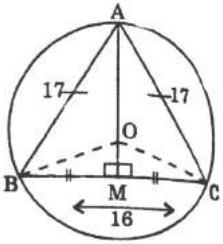
$= 5^2 + 12^2$

$= 13^2$

$OP = 13$

Hence (b) is the correct option.

20.



ΔABM

$AB^2 = AM^2 + BM^2$

$17^2 = AM^2 + 8^2$

$\Rightarrow \quad AM^2 = 17^2 - 8^2$

$= 289 - 64 = 225 = 15^2$

$AM = 15cm$

$OM = \frac{1}{3}(15) = 5cm$

ΔOBM

$OB^2 = OM^2 + BM^2$

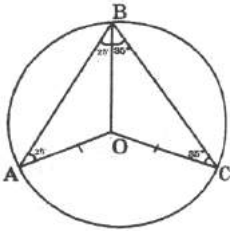
$= 5^2 + 8^2$

$= 25 + 64 = 89$

$OB\sqrt{89}cm$

Hence (a) is the correct option.

21.



$OA = OB$ (radii)

$|\underline{OAB} = |\underline{OBA} = 25$

$OB = OC$

$|\underline{OBC} = |\underline{OCB} = 35$

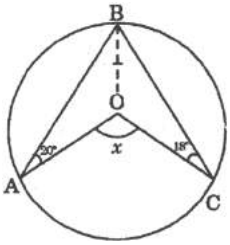
$\Rightarrow \quad |\underline{ABC} = 25^\circ + 35^\circ = 60^\circ$

$\Rightarrow \quad |\underline{AOC} = 2|\underline{ABC}$

$= 2 \times 60^\circ = 120^\circ$

Hence (b) is the correct option.

22.



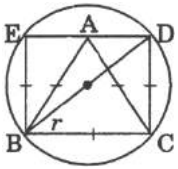
$x^\circ = 2\left(20^\circ + 18^\circ\right)$

$= 2 \times 38^\circ$

$= 76^\circ$

Hence (b) is the correct option.

23.



$$\frac{\text{Area of theTriangle}}{\text{Area of the squarum}} = \frac{T}{S} = \frac{3\sqrt{3}}{2}$$

Hence (a) is the correct option.

24. The length of the diagonal = 15 cm

Hence (b) is the correct option.

25. Triangle A B C the altitiude through A has length h, is right angled at A.

Then

$$\frac{1}{b^2} + \frac{1}{c^2} - \frac{1}{h^2} = 0$$

Since

Area of the triangle A B C

$\Rightarrow \quad \frac{1}{2}ah = \frac{1}{2}bc$

$\Rightarrow \quad ah = bc$

$\Rightarrow \quad \frac{1}{b^2} + \frac{1}{c^2} = \frac{b^2 + c^2}{b^2 c^2}$

$= \frac{a^2}{(bc)^2} = \frac{a^2}{(ah)^2}$

$= \frac{a^2}{a^2 h^2}$

$= \frac{1}{h^2}$

$\Rightarrow \quad \frac{1}{b^2} + \frac{1}{c^2} - \frac{1}{h^2} = 0$

Hence (b) is the correct option.

26. If the height of the rectangle is 4 then the width of the rectangle $= 32\sqrt{2}$

Hence (a) is the correct option.

27. The radii of circle $c_1, c_2 \ldots\ldots\ldots c_{2004}$ are respectively $r_1, r_2 \ldots\ldots\ldots r_{2004}$. If $r_1 = 1, r_i = r_{n+1}$ for $i - 1, 2, 3 \ldots\ldots\ldots\ldots 2004$ the $r_{2004} = 2004$

Hence (a) is the correct option.

SECTION - II

Assertion - Reason Questions

28. The Digonals of a parallelogram are bisect each other

The diagonals of Rhombus are perpendicular to each other.

Hence (a) is the correct option.

29. $DF \| BC$

$\Rightarrow \quad DF = \frac{1}{2} BC$

$= \frac{1}{2}(15)$

$= 7.5cm$

($\because$ Converse of Mid-point Theorum)

Hence (a) is the correct option.

30. In a trapezium, the segment joining the Mid Points its non parallel sides is parallel to it's parallel sides and half the sum of parallelsides.

and

The figure formed by joining the Mid-Points of the sides of a rectangle in order is a rhombus.

Hence (b) is the correct option.

31. If 'O' is the Mid point of AC then 0 is circumcentre of ΔABC

$\Rightarrow \quad OA = OB = OC = \frac{AC}{2}$

The figure formed by joining the Mid Points of the sides of a square in order another square.

Hence (b) is the correct option.

32. The area of a parallelogram is product of any of its side and corresponding altitudes.

Area of triangle is half the product of any its sides and the corresponding altitudes.

Hence (b) is the correct option.

33. AD is the Median and E is the Mid Point of AD.

Area of ΔAED

$= \frac{1}{2}$ Area of ΔABC

($\because$ The Median AD devides ΔABC in to two triangles which are equal in Area)

Area of ΔAED

$= \frac{1}{2}(\text{Area of } \Delta ABD)$

$= \frac{1}{2} = \left(\frac{1}{2} \text{Area of } \Delta ABC\right)$

$= \frac{1}{4} \text{Area of } \Delta ABC$

Hence (a) is the correct option.

34. $\angle AOB = 180^\circ$

$\angle APB = \frac{1}{2}(180^\circ)$

$= 90^\circ$,

The angle at a semi circle is 90°.

In equal circles if two are equal. They subtend equal angles at their correspondingly centres.

Hence (b) is the correct option.

35. The angle in the semi circle is 90°.

Hence (a) is the correct option.

36. Angle in a semi circle is 90°. Since angle subtended by an arc at the centre is double to the angle subtended by the same arc at any point on the circumference of the circle.

Hence (b) is the correct option.

SECTION - III

Linked Comprehension Type

37. $AB = 2 \times EF$

$= 2 \times 4 = 8$

$BC = 2 \times DE$

$= 2 \times 3 = 6$

$AC = 2 \times DF$

$= 2 \times 3.5 = 7$

$\Rightarrow$ Lengths of AB, AC and BC are 8, 7, 6

Hence (b) is the correct option.

38. The perimeter of ΔABC

$= 8 + 7 + 6 = 21cm$

Hence (a) is the correct option.

39. Area of ΔABC

= 4 Area of ΔDEF

Hence (d) is the correct option.

40. DE = EF

Since $\frac{AB}{BC} = \frac{DE}{EF}$

$\frac{AB}{AB} = \frac{DE}{EF}$

($\because$ AB = BC)

$\Rightarrow$ $DE = EF$

Hence (a) is the correct option.

41. $BX = \frac{1}{2} AD$

Hence (b) is the correct option.

42. $BE = \frac{1}{2}(AD + CF)$

$\Rightarrow$ $AD + CF = 2BE$

Hence (d) is the correct option.

43. $BG = 6cm$

$$BG = \frac{2}{3}BE$$

$$\Rightarrow \quad 6 = \frac{2}{3}BE$$

$$\Rightarrow \quad B = \frac{18}{2} = 9cm$$

$$GE = BE - BG = 9 - 6 = 3cm$$

Hence (a) is the correct option.

44. $$FG = \frac{1}{3}CF$$

$$\Rightarrow \quad 4 = \frac{1}{3}CF$$

$$\Rightarrow \quad CF = 12cm$$

$$CG = CF - FG = 12 - 4 = 8cm$$

Hence (b) is the correct option.

45. $AD = 7.5cm$

$$\Rightarrow \quad GD = \frac{1}{3}AD$$

$$= \frac{1}{3}(7.5)$$

$$= 2.5cm$$

Hence (c) is the correct option.

46. Area of ΔABC

$$= \frac{1}{2} \times 8 \times 4$$

$$= 16cm^2$$

Hence (a) is the correct option.

47. Area of ΔABC

$$16 = \frac{1}{2} \times 5 \times BC$$

$$\Rightarrow \quad \frac{16 \times 2}{5} = BC$$

$$\Rightarrow \quad BC = 6.4cm$$

Hence (b) is the correct option.

48. ΔABE

$$BE^2 = AB^2 - AE^2$$

$$= 8^2 - 5^2$$

$$= 64 - 25$$

$$= 39$$

$$BE = \sqrt{39}cm$$

Hence (b) is the correct option.

49. $\angle RPB = 30^\circ$

Hence (a) is the correct option.

50. $\angle PBR = 115^\circ$

Hence (b) is the correct option.

51. $\angle BRP = 35^\circ$

Hence (c) is the correct option.

52. Area of $\Delta(AQR)$

= Area of $\Delta(BPQ)$

$(\because PR = BC)$

Hence (a) is the correct option.

53. Area of ΔCPR

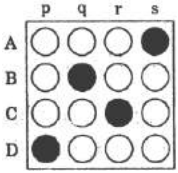
= Area of ΔCAR

Hence (b) is the correct option.

54. Area of ΔPQC
$=$ Area of ΔAQR
Hence (c) is the correct option.

SECTION – IV
Matrix - Match Type

55.



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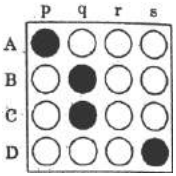

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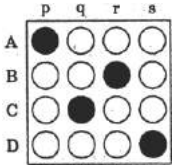
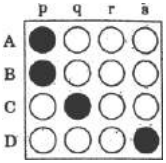


58.



59.