SSLC MODEL EXAMINATION- 2023

ANSWER KEY

1) a) 3

b) $5d = 5 \times 3 = 15$

2) a) $\angle B = 360 - (100 + 120 + 50) = 90°$
B is on the circle.

b) Since $\angle D$ is less than $90°$ we can say D is outside the circle with AC as the diameter.

3) a) $p(1) = 0 \to a + b + c = 0$

b) $p(-1) = 0$
$a - b + c = 0, a + c = b$

4) a) $(0, 0)$

b) $(1, -1)$

From 5 to 11 attempt any five . Score $5 \times 3 = 15$

5) a) $45°$

b) $\frac{1}{8}$

6) a) $x^2 + 24x = 180°$

b) $x^2 + 24x + 144 = 180 + 144$, $(x + 12)^2 = 324$, $x + 12 = 18, x = 6$
Angles are $36°, 144°$

7) a) $BPQR, RPQC, APRQ$ are the parallelograms

b) $B(1 + 2 - 3, 2 + 1 - 2)$, $B(0, 1)$
$A(1 + 3 - 2, 2 + 2 - 1)$, $A(2, 3)$
$C(2 + 3 - 1, 1 + 2 - 2)$, $C(4, 1)$

8) a) $D(-2, 4)$

b) $AB = 4, BC = 3$. Perimeter is 14

c) Diagonal $= \sqrt{(2 - -2)^2 + (4 - 1)^2} = 5$

9) a) $3\pi r^2 = 243\pi$, $r^2 = 81, r = 9$

b) $\pi r^2 = 81\pi$

c) $4\pi \times 9^2 = 324\pi$

10) ⋆ Draw a circle of radius 3cm

⋆ Draw a diameter. Construct tangents to the circle at the ends of the diameter.

⋆ These are parallel tangents

11) a) 2

b) $(3, 6), (3, 2)$

c) $(x - 3)^2 + (y - 4)^2 = 2^2$

From 12 to 20 attempt any six . Score $7 \times 4 = 28$

12) a) $\angle A = 50^\circ$

b) Since $\angle A = \angle B$ the opposite sides are equal.$BC = 8$cm

c) Draw AD perpendicular to BC.(Draw a rough diagram)
In the right triangle ADC , $\sin 80 = \frac{AD}{8}$
$AD = 8 \times 0.98 = 7.84$cm

13) a) $x - 1$ is a factor. $p(1) = 0$,
$1^3 + 2 \times 1^2 - 7 \times 1 + k = 0, k = 4$

b) $p(x) = x^3 + 2x^2 - 7x + 4$
$p(-1) = (-1)^3 + 2(-1)^2 - 7(-1) + 4 = 12 \neq 0$
$x + 1$ is not a factor.

14) a) Since $x_1 = 10, x_{17} = 74$ then $16d = 74 - 10 = 64$
$d = 4$

b) Median is 9 th term. It is $\frac{10+74}{2} = 42$
or
$x_1 + 8d = 10 + 8 \times 4 = 42$

c) Since data is in arithmetic sequence mean and median are equal. So mean is also 42

15) a) Center$(4, 0)$, Radius 4

b) $(x - 4)^2 + (y - 0)^2 = 4^2$
$x^2 + y^2 - 8x = 0$

16) a) One side is x and other side $2x$
Area $2x \times x = 2x^2$,Perimeter is $2(x + 2x) = 6x$
Given that $2x^2 = 12x$

b) $2x^2 = 12x, x = 6$
Sides are 6 and 12

17) a) $ABCD$ is a cyclic quadrilateral
$\angle ADC = 180 - 135 = 45^\circ$
$\angle CAD = 45^\circ$

b) $\triangle ACD$ is a $45^\circ, 45^\circ, 90^\circ$ triangle.
$AD = 12\sqrt{2}$cm

18) a) $\triangle ADB$ is a $30^\circ - 60^\circ - 90^\circ$ triangle
$\angle ADC = 60^\circ, \angle AOC = 2 \times 60 = 120^\circ$

b) Side opposite to 60° is 12
Side opposite to 30° is $\frac{12}{\sqrt{3}} = 4\sqrt{3}$cm
Radius is $2\sqrt{3}$cm

19) a) Radius of the sectoral sheet is equal to slant height of the cone. It is 10cm

b) $lx = 360r \rightarrow 10 \times x = 360 \times 5, x = 180^\circ$

c) $l^2 = h^2 + r^2, 100 - 25 = h^2, h = 5\sqrt{3}$
Volume $\frac{1}{3} \times \pi r^2 h = \frac{125\sqrt{3}\pi}{3}$

20) Table

Scores	Number of children
Below 10	5
Below 20	13
Below 30	23
Below 40	36
Upto 50	45

a) $n = 45$ (odd number)
23 rd score in the ascending order comes in the middle.It belons to the class $20 - 30$
10 scores is divided equally among 10 children. Each one's share is 1
14 th score is $20 + \frac{1}{2} = 20.5$

b) It is assumed that the score distribution in the median class are in arithmetic sequence.The first term is 20.5 and common difference 1.
10 th term is the score of 23 rd child.
It is $20.5 + 9 \times 1 = 29.5$
Median is 29.5

From 21 to 29 attempt any six . Score $7 \times 5 = 35$

21) a) $d = 3$

b) $x_{21} - x_1 = 20d, x_{22} - x_2 = 20d, x_{23} - x_3 = 20d \cdots$
All are $20 \times 3 = 60$

c) $(x_{21} + x_{22} + x_{23} \cdots + x_{40}) - (x_1 + x_2 + x_3 + \cdots + x_{20})$
$= (x_{21} - x_1) + (x_{22} - x_2) + \cdots + (x_{40} - x_{20}) = 20 \times 20d = 20 \times 60 = 1200$

22) a) Draw a circle of radius 3cm and mark its center as O

b) Draw a line through O , mark a point P at the distance 7cm from O on this line

c) Draw a circle with diameter OP.This circle intersect the first circle at A and B

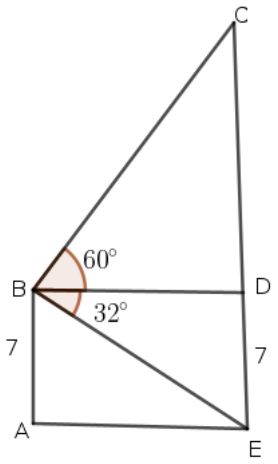
d) Draw PA and PB. These are tangents to the circle.

23) a) $\frac{24}{4} = 6$

b) Sides are x and $x + 6$

c) $x^2 + (x + 6)^2 = 356$
$x^2 + x^2 + 12x + 36 - 356 = 0$
$2x^2 + 12x - 320 = 0, x^2 + 6x - 160 = 0$
Solving $x = 10$. Sides are 10 and 16

24) a) Draw a diagram
$AB \rightarrow$Building
$CE \rightarrow$ Light house



b) In triangle BDE , $\tan 32 = \frac{7}{BD}$
$BD = 11.29$ meter
The distance between building and light house is 11.29 meter

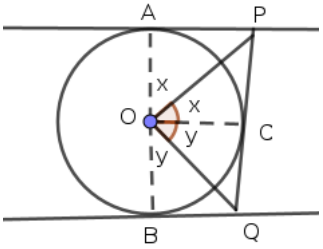
c) Triangle BDC is a $30-60-90$ triangle.$CD = BD \times \sqrt{3} = 11.29 \times 1.73 = 19.53$ meter
Height of light house $19.53 + 7 = 26.53$meter

25) a) $A(3,8), B(3,4), C(7,4)$

b) $AB = \mid 8-4 \mid 4$, $BC = \mid 7-3 \mid = 4$, $AC = 4\sqrt{2}$
Angles are $\angle A = \angle C = 45°$

c) Radius $2\sqrt{2}$,Center $(\frac{3+7}{2}, \frac{8+4}{2}) = (5,6)$

26) a) Diagram



b) $\triangle AOP, \triangle COP$ are equal
$\triangle BOQ, \triangle COQ$ are equal

c) $\angle AOP = \angle COP = x, \angle BOQ = \angle COQ = y$
$2x + 2y = 180, x + y = 90°$
$\angle POQ = 90°$

27) a) $h = 17 - 5 = 12$cm, $l = \sqrt{12^2 + 5^2} = 13$cm

b) Total surface area $= 2\pi r^2 + \pi rl = 115\pi$ cm^2

c) Volume $= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 \times 12 = \frac{550\pi}{3}$

28) a) 55

b) 110

c) 100

d) 100

e) 30

29) a) $2, 4, 8, 6, 2, 4, 8, 6 \cdots$

b) 6

c) 4

d) $20 \times 12 + 2 + 4 = 246$