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Secondary School Examination

March - 2015

Marking Scheme--- Mathematics (NSQF) 530/1, 530/2, 530/3

General Instructions

1. The Marking Scheme provides general guidelines to reduce subjectivity and maintain uniformity among large number of examiners involved in the marking. The answers given in the marking scheme are the best suggested answers.
2. Marking is to be done as per the instructions provided in the marking scheme. (It should not be done according to one's own interpretation or any other consideration.)Marking Scheme should be strictly adhered to and religiously followed.
3. Alternative methods are accepted. Proportional marks are to be awarded.
4. The Head-Examiners have to go through the first five answer-scripts evaluated by each evaluator to ensure that the evaluation has been done as per instructions given in the marking scheme. The remaining answer scripts meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. If a question is attempted twice and the candidate has not crossed any answer, only first attempt is to be evaluated. Write 'EXTRA' with second attempt.
6. A full scale of marks 0 to 90 has to be used. Please do not hesitate to award full marks if the answer deserves it.
7. Separate Marking Scheme for all the three sets has been given.
8. The Examiners should acquaint themselves with the guidelines given in the Guidelines for Spot Evaluation before starting the actual evaluation.
9. Every Examiner should stay upto sufficiently reasonable time normally 5-6 hours every day and evaluate 20-25 answer books and should devote minimum 15-20 minutes to evaluate each answer book.
10. Every Examiner should acquaint himself/herself with the marking schemes of all the sets.

QUESTION PAPER CODE 530/1

EXPECTED ANSWERS/VALUE POINTS

SECTION - A

Q.No. Marks

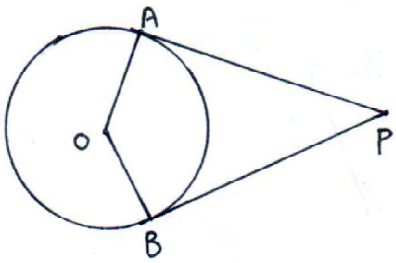
1-4 k = 1 2. 5 cm. 3. 1 : 2 4. 28 cm. 4 x 1 = 4 m

SECTION - B

5. For equal roots

$(-40)^2 - 4 \times 2p \times 25 = 0$ 1 m

Solving to get $p = 8$ 1 m

6. 

$\angle PAO + \angle PBO = 90^\circ + 90^\circ = 180^\circ$ 1 m

As, Both the pair of opposite angles are supple mentary

$\Rightarrow$ OAPB is cyclic 1 m

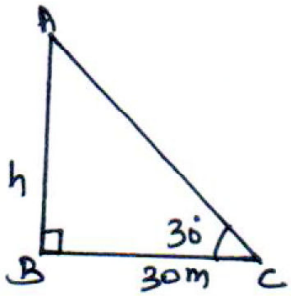
7. 

Figure ½ m

$\tan 30^\circ = \frac{h}{30}$ ½ m

$\frac{30}{\sqrt{3}} = h$

$\Rightarrow h = 10\sqrt{3} = 10 \times 1.732 = 17.32$ m 1 m

8. Area of sector $= \frac{\theta}{360} \cdot \pi r^2$ ½ m

$= \frac{120}{360} \times \frac{22}{7} \times 21 \times 21$ ½ m

$= 462$ cm^2 1 m

9. $a^3 = 343$

$a = 7$ cm — 1 m

Surface area $= 5a^2 + 4a^2 + 5a^2$ — ½ m

$= 14a^2 = 14\,(7)^2 = 686$ cm^2 — ½ m

10. $a^3 = \pi r^2 h$ — ½ m

$(11)^3 = \frac{22}{7} \times 11 \times 11 \times h$

$\Rightarrow h = \frac{7}{2}$ or 3.5 cm — 1 m

Height of water in the cylinder $= 12 + 3.5 = 15.5$ cm — ½ m

SECTION - C

11. $4x^2 - 2a^2x - 2b^2x + a^2b^2 = 0$ — ½ m

$2x\,(2x - a^2) - b^2\,(2x - a^2) = 0$ — 1 m

$(2x - b^2)\;(2x - a^2) = 0$ — 1 m

$x = \frac{b^2}{2}, \frac{a^2}{2}$ — ½ m

12. $D = (-2)^2 - 4 \times 3 \times \frac{1}{3}$

$= 4 - 4 = 0$ — 1 m

Nature of roots = real and equal — 1 m

$x = \frac{2 \pm 0}{6} = \frac{1}{3}, \frac{1}{3}$ — 1 m

13. Let the number be $10x + y$ ½ m

$xy = 12 \Rightarrow y = \frac{12}{x}$ ½ m

$10x + y + 36 = 10y + x$ ½ m

$x - y + 4 = 0$

$x - \frac{12}{x} + 4 = 0$

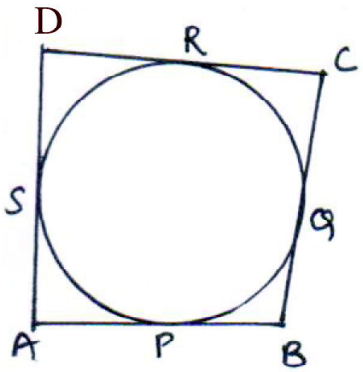
$x^2 + 4x - 12 = 0$

$x^2 + 6x - 2x - 12 = 0$ ½ m

$x = 2$

$y = 6$ ½ m

Number is 26 ½ m

14. 

$AP = AS$

$BP = BQ$

$CQ = CR$

$DS = DR$ 1 m

$2AD = AD + BC = AS + SD + BQ + QC$

$= AP + DR + BP + CR$

$= AB + DC = 2AB$ 1 m

$\Rightarrow AD = AB$

adjacent sides of 11gm are equal } 1 m

$\Rightarrow$ ABCD is a Rhombus

15. $\angle OAB = \frac{1}{2} \times 120 = 60^{o}$ 1 m

$\cos 60^{o} = \frac{AB}{OA} = \frac{1}{2}$ 1½ m

$2\,AB = OA$ ½ m

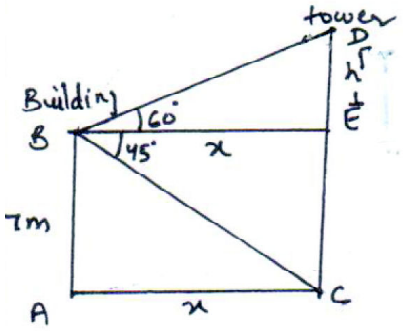
16. 

Figure ½ m

$\tan 45^{o} = \frac{7}{x}$

$\Rightarrow \quad x = 7\text{m}$ 1 m

$\tan 60^{o} = \frac{h}{x}$

$7\sqrt{3} = h$ 1 m

height of tower $= 7 + 7\sqrt{3}$ or $7\left(\sqrt{3}+1\right)\text{m}$ ½ m

17. Area of minor segment $= \frac{90}{360} \times 3.14 \times 10 \times 10 - \frac{1}{2} \times 10 \times 10$ 1 m

$= 78.5 - 50$ 1½ m

$= 28.5\ \text{cm}^2$ ½ m

18. Area of Shaded part $= (6)^2 - \pi(1.5)^2 - 4 \times \frac{1}{4}\pi(1)^2$ 1 m

$= 36 - 7.07 - 3.14$ 1 m

$= 25.79\ \text{cm}^2$ 1 m

19. $20{,}000 \times \frac{20}{60} \times \frac{300}{100} \times \frac{120}{100} = \text{area} \times \frac{8}{100}$ 1½ m

$\text{area} = 3{,}00{,}000\ m^2$ 1½ m

20. Volume of remaining solid $= (14)^3 - \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$ ½ m

$= 2744 - \frac{2156}{3}$

$= 2025.34\ cm^3$ 1 m

Surface area of remaining solid $= 69^2 + \pi r^2$

$= 6(14)^2 + \frac{22}{7}(7)^2$ ½ m

$= 1176 + 154 = 1330\ cm^2$ 1 m

SECTION - D

21. $\frac{x+2+2x+2}{(x+1)(x+2)} = \frac{4}{x+4}$ 1 m

$\frac{3x+4}{x^2+3x+2} = \frac{4}{x+4}$

$x^2 - 4x - 8 = 0$ 2 m

$x = \frac{4 \pm \sqrt{48}}{2} = 2 \pm 2\sqrt{3}$ 1 m

22. $D = [2(ac+bd)]^2 - 4(a^2+b^2)(c^2+d^2)$ 1 m

$= 4a^2c^2 + 4b^2d^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2$ 1 m

$= -4(a^2d^2 + b^2c^2 - 2abcd)$ 1 m

$= -4(ad-bc)^2$

If $ad = bc$ then $D = 0$

If $ad \neq bc$ then $D < 0$ 1 m

So for no real roots $ad \neq bc$

23. Let the number of articles = x

cost of each article $= \frac{900}{x}$

number of remaining articles = x – 5

cost of each remaining articles $= \frac{900}{x-5}$

1 m

$$\frac{900}{x-5} - \frac{900}{x} = 2$$ 1 m

On solving , $x^2 - 5x - 2250 = 0$ 1 m

$x^2 + 45x - 50x - 2250 = 0$ 1 m

$\Rightarrow \quad x = 50$

No. of articles = 50

24. Let the speed of stream = x km/h ½ m

$$\frac{30}{15-x} + \frac{30}{15+x} = 4\frac{1}{2}$$ 1½ m

On sloving $1800 = 2025 - 9x^2$ 1 m

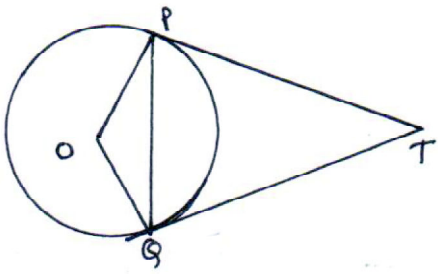
$x^2 = 25$

$x = 5$ 1 m

Hence speed of stream = 5 km/h

25. For correct given, To prove, Construction and figure ½ x 4 = 2 m

For correct proof 2 m

26. 

$OQ = OP$

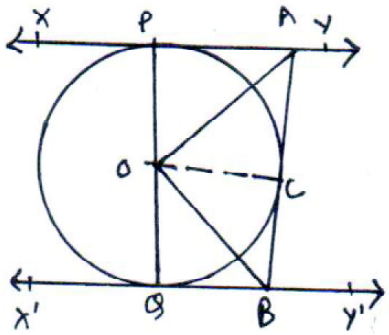
$\angle OPQ = \angle OQP$

$\Rightarrow \quad 2\angle OPQ + \angle POQ = 180^{o}$ .....(1) 1½ m

$\angle POQ + \angle PTQ = 180^{o}$ .....(2) 1½ m

By (1) & (2)

$2\angle OPQ = \angle PTQ$ 1 m

27. 

$\Delta POA \cong \Delta AOC$

$\Rightarrow \quad \angle POA = \angle AOC \ (\text{By CPCT})$ 2 m

Similarly, $\angle QOB = \angle BOC$ 1 m

$\angle POB + \angle AOC + \angle COB + \angle BOQ = 180^{o}$

$2(\angle AOC + \angle COB) = 180^{o}$

$\angle AOB = 90^{o}$ 1 m

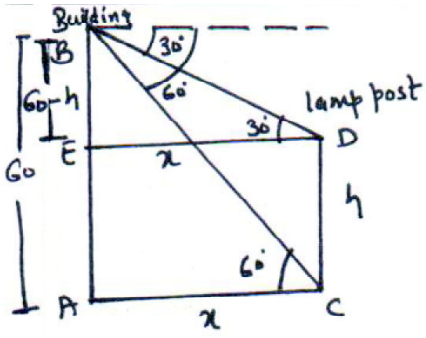
28. 

Figure.... 1 m

$\tan 60^{o} = \dfrac{60}{x}$

$x = \dfrac{60}{\sqrt{3}}$ or $20\sqrt{3}$ 1 m

$\tan 30^{o} = \dfrac{60-h}{x}$

$\dfrac{20\sqrt{3}}{\sqrt{3}} = 60 - h$

$\Rightarrow \quad h = 40$ 1½ m

height of lamp post = 40m ½ m

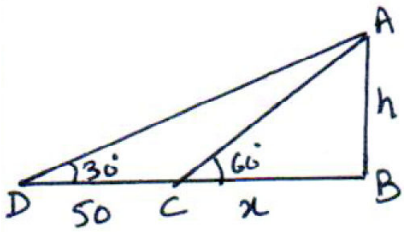
29. 

Figure .... 1 m

$\tan 60^\circ = \frac{h}{x}$

$h = x\sqrt{3}$ 1 m

$\tan 30^\circ = \frac{h}{50+x}$

$3x = 50 + x$

$x = 25$ 1 m

Height of chimney $= 25\sqrt{3} = 25 \times 1.732 = 43.3$ m ½ m

No, chimney is not controlling pollution according to the rules ½ m

30. Area of path $= \pi\left((21)^2 - (17.5)^2\right)$ 1½ m

$= \frac{22}{7} \times (441 - 306.25)$

$= 423.5\ m^2$ 1½ m

Cost of constructing the path $= 25 \times 423.5 =$ Rs. 10587.50 1 m

31. Volume of Container $= \frac{1}{3} \times 3.14 \times 16\left((20)^2 + (8)^2 + 20 \times 8\right)$ 1 m

$= \frac{1}{3} \times 3.14 \times 16 \times 624$ 1 m

$= 10449.9\ cm^3$ or $10.45\ \ell$ 1 m

Cost of milk $= 10.45 \times 30 =$ Rs. 313.5 or Rs. 314 (approx) 1 m

QUESTION PAPER CODE 530/2

EXPECTED ANSWERS/VALUE POINTS

SECTION - A

Q.No. Marks

1-4 1 : 2 2. 28 cm. 3. 5cm 4. k = 1 4 x 1 = 4 m

SECTION - B

5. $a^3 = 343$

$a = 7$ cm 1 m

Surface area $= 5a^2 + 4a^2 + 5a^2$ ½ m

$= 14a^2 = 14\,(7)^2 = 686\ cm^2$ ½ m

6. For equal roots

$(-40)^2 - 4 \times 2p \times 25 = 0$ 1 m

Solving to get $p = 8$ 1 m

7. $a^3 = \pi r^2 h$ ½ m

$(11)^3 = \frac{22}{7} \times 11 \times 11 \times h$

$\Rightarrow h = \frac{7}{2}$ or 3.5 cm 1 m

Height of water in the cylinder $= 12 + 3.5 = 15.5$ cm ½ m

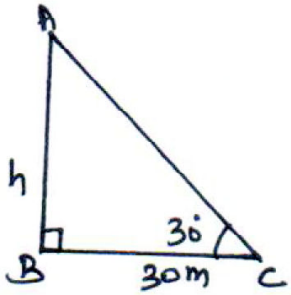
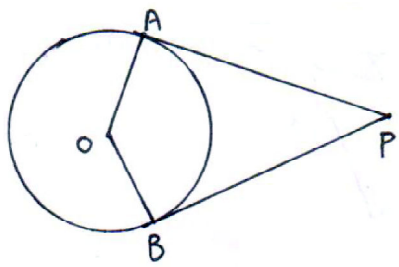
8. 

Figure ½ m

$\tan 30^\circ = \frac{h}{30}$ ½ m

$\frac{30}{\sqrt{3}} = h$

$\Rightarrow h = 10\sqrt{3} = 10 \times 1.732 = 17.32$ m 1 m

9. 

$\angle PAO + \angle PBO = 90^o + 90^o = 180^o$ 1 m

As, Both the pair of opposite angles are supple mentary 1 m

$\Rightarrow$ OAPB is cyclic

10. Area of sector of circle $= \frac{60}{360} \times \frac{22}{7} (14)^2$ 1 m

$= \frac{308}{3}$ or $102.66\ cm^2$ 1 m

SECTION - C

11. $20,000 \times \frac{20}{60} \times \frac{300}{100} \times \frac{120}{100} = \text{area} \times \frac{8}{100}$ 1½ m

area $= 3,00,000\ m^2$ 1½ m

12. $\angle OAB = \frac{1}{2} \times 120 = 60^o$ 1 m

$\cos 60^o = \frac{AB}{OA} = \frac{1}{2}$ 1½ m

$2\,AB = OA$ ½ m

13. Volume of remaining solid $= (14)^3 - \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$ ½ m

$= 2744 - \frac{2156}{3}$

$= 2025.34\ cm^3$ 1 m

Surface area of remaining solid $= 69^2 + \pi r^2$

$= 6(14)^2 + \frac{22}{7}(7)^2$ ½ m

$= 1176 + 154 = 1330\ cm^2$ 1 m

14. $4x^2 - 2a^2x - 2b^2x + a^2b^2 = 0$ ½ m

$2x(2x - a^2) - b^2(2x - a^2) = 0$ 1 m

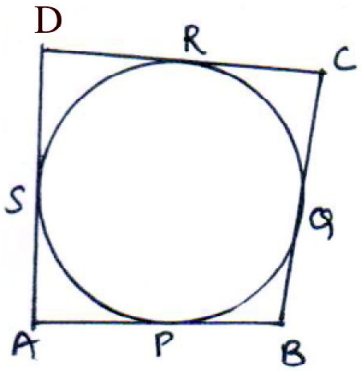
$(2x - b^2)\ (2x - a^2) = 0$ 1 m

$x = \frac{b^2}{2}, \frac{a^2}{2}$ ½ m

15. Area of Shaded part $= (6)^2 - \pi(1.5)^2 - 4 \times \frac{1}{4}\pi(1)^2$ 1 m

$= 36 - 7.07 - 3.14$ 1 m

$= 25.79\ cm^2$ 1 m

16. 

AP = AS

BP = BQ

CQ = CR

DS = DR 1 m

2AD = AD + BC = AS + SD + BQ + QC

= AP + DR + BP + CR

= AB + DC = 2AB 1 m

$\Rightarrow$ AD = AB

adjacent sides of 11gm are equal 1 m

$\Rightarrow$ ABCD is a Rhombus

17. Let the number be 10x + y ½ m

$xy = 12 \Rightarrow y = \frac{12}{x}$ ½ m

$10x + y + 36 = 10y + x$ ½ m

$x - y + 4 = 0$

$x - \frac{12}{x} + 4 = 0$

$x^2 + 4x - 12 = 0$

$x^2 + 6x - 2x - 12 = 0$ ½ m

$x = 2$

$y = 6$ ½ m

Number is 26 ½ m

18. $D = \left(-4\sqrt{3}\right)^2 - 4 \times 3 \times 4$

$= 48 - 48 = 0$ 1 m

Nature of roots = real and equal 1 m

$x = \frac{4\sqrt{3} \pm 0}{6} = \frac{2}{3}\sqrt{3}, \frac{2}{3}\sqrt{3}$ 1 m

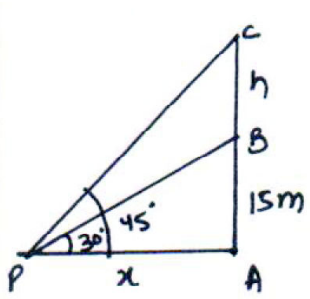
19. 

Figure ½ m

$\tan 30^\circ = \frac{15}{x}$

$x = 15\sqrt{3}$ 1 m

$\tan 45^\circ = \frac{15 + h}{15\sqrt{3}}$

$15\left(\sqrt{3} - 1\right) = h$ 1 m

height of flag staff $= 15\,(1.732 - 1) = 10.98$ m

distance $= 15 \times 1.732 = 25.98$m ½ m

20. Distance covered in 1 revolution $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 42$$

$$= 264 \text{ cm} \qquad 1 \text{ m}$$

$$\text{No. of revolutions} = \frac{7920000}{264} = 30{,}000 \qquad 1 \text{ m}$$

$$\text{No. of revolutions per min} = \frac{30{,}000}{60} = 500 \qquad 1 \text{ m}$$

SECTION - D

21. $\text{Volume of Container} = \frac{1}{3} \times 3.14 \times 16 \left((20)^2 + (8)^2 + 20 \times 8\right)$ 1 m

$$= \frac{1}{3} \times 3.14 \times 16 \times 624 \qquad 1 \text{ m}$$

$$= 10449.9 \text{ cm}^3 \text{ or } 10.45\ \ell \qquad 1 \text{ m}$$

$$\text{Cost of milk} = 10.45 \times 30 = \text{Rs. } 313.5 \text{ or Rs. } 314 \text{ (approx)} \qquad 1 \text{ m}$$

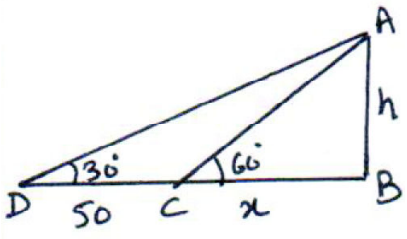
22. 

Figure .... 1 m

$$\tan 60^\circ = \frac{h}{x}$$

$$h = x\sqrt{3} \qquad 1 \text{ m}$$

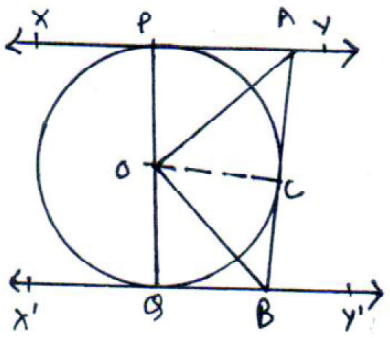
$$\tan 30^\circ = \frac{h}{50 + x}$$

$$3x = 50 + x$$

$$x = 25 \qquad 1 \text{ m}$$

$$\text{Height of chimney} = 25\sqrt{3} = 25 \times 1.732 = 43.3 \text{ m} \qquad ½ \text{ m}$$

No, chimney is not controlling pollution according to the rules ½ m

23. 

$\Delta POA \cong \Delta AOC$

$\Rightarrow \angle POA = \angle AOC$ (By CPCT) 2 m

Similarly, $\angle QOB = \angle BOC$ 1 m

$\angle POB + \angle AOC + \angle COB + \angle BOQ = 180^o$

$2(\angle AOC + \angle COB) = 180^o$

$\angle AOB = 90^o$ 1 m

24. For correct given, To prove, Construction and figure ½ x 4 = 2 m

For correct proof 2 m

25. Let the number of articles = x

$$\text{cost of each article} = \frac{900}{x}$$

1 m

number of remaining articles = x – 5

$$\text{cost of each remaining articles} = \frac{900}{x-5}$$

$$\frac{900}{x-5} - \frac{900}{x} = 2$$ 1 m

On solving , $x^2 - 5x - 2250 = 0$ 1 m

$x^2 + 45x - 50x - 2250 = 0$ 1 m

$\Rightarrow x = 50$

No. of articles = 50

26. $D = [2(ac + bd)]^2 - 4(a^2 + b^2)(c^2 + d^2)$ 1 m

$= 4a^2c^2 + 4b^2d^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2$ 1 m

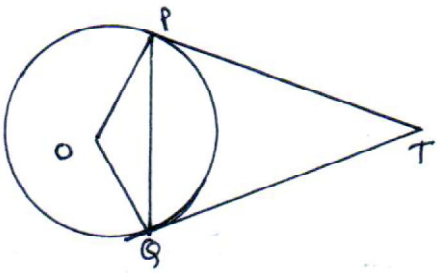
$= -4\,(a^2d^2 + b^2c^2 - 2abcd)$ 1 m

$= -4\,(ad - bc)^2$

If $ad = bc$ then $D = 0$

If $ad \neq bc$ then $D < 0$ 1 m

So for no real roots $ad \neq bc$

27. 

$OQ = OP$

$\angle OPQ = \angle OQP$

$\Rightarrow \quad 2\angle OPQ + \angle POQ = 180^o$ .....(1) 1½ m

$\angle POQ + \angle PTQ = 180^o$ .....(2) 1½ m

By (1) & (2)

$2\angle OPQ = \angle PTQ$ 1 m

28. $2\pi r = \dfrac{6600}{25}$

$r = 264 \times \dfrac{7}{22} \times \dfrac{1}{2}$

$r = 42$ m 2 m

Area $= \pi r^2 = \dfrac{22}{7} \times 42 \times 42$

$= 5544\ m^2$ 1 m

Cost of fencing $= 5544 \times 0.75 =$ Rs. 4158 1 m

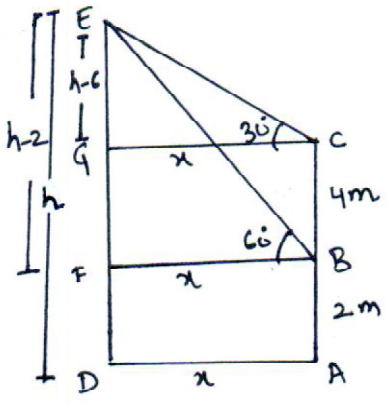
29. 

Figure.... 1 m

$\tan 60^\circ = \dfrac{h-2}{x}$

$x = \dfrac{h-2}{\sqrt{3}}$ .....(1) 1 m

$\tan 30^\circ = \dfrac{h-6}{x}$

$x = \sqrt{3}(h-6)$.....(2) 1 m

from (1) & (2)

$\sqrt{3}(h-6) = \dfrac{h-2}{\sqrt{3}}$ ½ m

$\Rightarrow$ h = 8 height of Balloon = 8m ½ m

above the ground

30. Let the speed of stream = x km/h ½ m

$\dfrac{48}{20-x} - \dfrac{48}{20+x} = 1$ 1½ m

$x^2 + 96x - 400 = 0$ 1 m

$x^2 + 100x - 4x - 400 = 0$

$x = 4$ 1 m

Speed of stream = 4 km/h

31. $\dfrac{x-1+2x-3}{(2x-3)(x-1)} = \dfrac{8}{15}$ 1 m

$\dfrac{3x-4}{2x^2-5x+3} = \dfrac{8}{15}$

$16x^2 - 85x + 84 = 0$ 2 m

$16x^2 - 64x - 21x + 84 = 0$

$(16x-21)(x-4) = 0$

$x = \dfrac{21}{16}, 4$ 1 m

12. $\angle OAB = \frac{1}{2} \times 120 = 60^o$ 1 m

$\cos 60^o = \frac{AB}{OA} = \frac{1}{2}$ 1½ m

$2\,AB = OA$ ½ m

13. Area of Shaded part $= (6)^2 - \pi (1.5)^2 - 4 \times \frac{1}{4} \pi (1)^2$ 1 m

$= 36 - 7.07 - 3.14$ 1 m

$= 25.79\ cm^2$ 1 m

14. $20{,}000 \times \frac{20}{60} \times \frac{300}{100} \times \frac{120}{100} = \text{area} \times \frac{8}{100}$ 1½ m

$\text{area} = 3{,}00{,}000\ m^2$ 1½ m

15. $4x^2 - 2a^2x - 2b^2x + a^2b^2 = 0$ ½ m

$2x(2x - a^2) - b^2(2x - a^2) = 0$ 1 m

$(2x - b^2)(2x - a^2) = 0$ 1 m

$x = \frac{b^2}{2}, \frac{a^2}{2}$ ½ m

16. Volume of remaining solid $= (14)^3 - \frac{2}{3} \times \frac{22}{7} \times 7 \times 7 \times 7$ ½ m

$= 2744 - \frac{2156}{3}$

$= 2025.34\ cm^3$ 1 m

Surface area of remaining solid $= 69^2 + \pi r^2$

$= 6(14)^2 + \frac{22}{7}(7)^2$ ½ m

$= 1176 + 154 = 1330\ cm^2$ 1 m

17. $D = (-2)^2 - 4 \times 3 \times \frac{1}{3}$

$= 4 - 4 = 0$ 1 m

Nature of roots = real and equal 1 m

$x = \frac{2 \pm 0}{6} = \frac{1}{3}, \frac{1}{3}$ 1 m

18. Let the number be $10x + y$ ½ m

$xy = 12 \Rightarrow y = \frac{12}{x}$ ½ m

$10x + y + 36 = 10y + x$ ½ m

$x - y + 4 = 0$

$x - \frac{12}{x} + 4 = 0$

$x^2 + 4x - 12 = 0$

$x^2 + 6x - 2x - 12 = 0$ ½ m

$x = 2$

$y = 6$ ½ m

Number is 26 ½ m

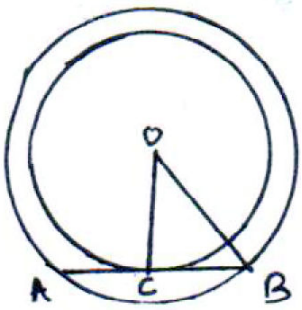
19. 

Figure ½ m

$OB^2 = OC^2 + CB^2$

$(10)^2 = (8)^2 + CB^2$

$CB^2 = 36$ 1½ m

$CB = 6$ cm

$AB = 2 \times 6 = 12$cm ($\perp$ from centre

to the chord bisects the chord) 1

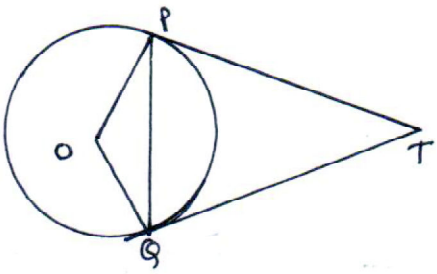
20. Area of sector $= \frac{30}{360} \times 3.14 \times 6 \times 6$

$= 9.42 \text{ cm}^2$ 1½ m

Area of major sector $= \frac{330}{360} \times 3.14 \times 6 \times 6$

$= 103.62 \text{ cm}^2$ 1½ m

SECTION - D

21. 

$OQ = OP$

$\angle OPQ = \angle OQP$

$\Rightarrow 2\angle OPQ + \angle POQ = 180^\circ$ .....(1) 1½ m

$\angle POQ + \angle PTQ = 180^\circ$ .....(2) 1½ m

By (1) & (2)

$2\angle OPQ = \angle PTQ$ 1 m

22. Let the number of articles = x

cost of each article $= \frac{900}{x}$

1 m

number of remaining articles = x – 5

cost of each remaining articles $= \frac{900}{x-5}$

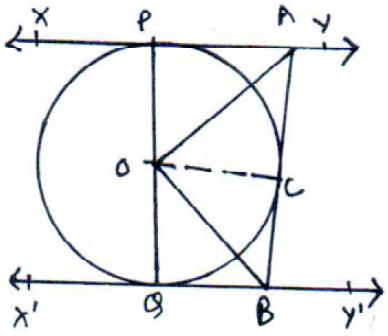
$\frac{900}{x-5} - \frac{900}{x} = 2$ 1 m

On solving , $x^2 - 5x - 2250 = 0$ 1 m

$x^2 + 45x - 50x - 2250 = 0$

$\Rightarrow \quad x = 50$ 1 m

No. of articles = 50

23. 

$\Delta POA \cong \Delta AOC$

$\Rightarrow \quad \angle POA = \angle AOC \ (\text{By CPCT})$ 2 m

Similarly, $\angle QOB = \angle BOC$ 1 m

$\angle POB + \angle AOC + \angle COB + \angle BOQ = 180^o$

$2(\angle AOC + \angle COB) = 180^o$

$\angle AOB = 90^o$ 1 m

24. $D = [2(ac + bd)]^2 - 4(a^2 + b^2)(c^2 + d^2)$ 1 m

$= 4a^2c^2 + 4b^2d^2 + 8abcd - 4a^2c^2 - 4a^2d^2 - 4b^2c^2 - 4b^2d^2$ 1 m

$= -4(a^2d^2 + b^2c^2 - 2abcd)$ 1 m

$= -4(ad - bc)^2$

If $ad = bc$ then $D = 0$

If $ad \neq bc$ then $D < 0$ 1 m

So for no real roots $ad \neq bc$

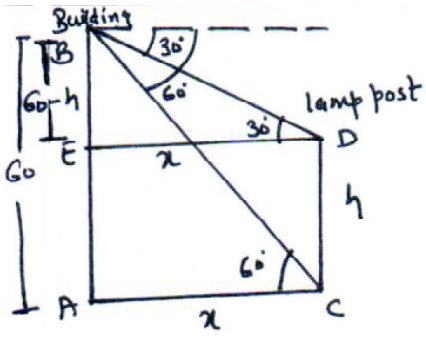
25. 

Figure.... 1 m

$\tan 60^o = \dfrac{60}{x}$

$x = \dfrac{60}{\sqrt{3}}$ or $20\sqrt{3}$ 1 m

$\tan 30^o = \dfrac{60 - h}{x}$

$$\frac{20\sqrt{3}}{\sqrt{3}} = 60 - h$$

$\Rightarrow$ h = 40 1½ m

height of lamp post = 40m ½ m

26. Volume of Container $= \frac{1}{3} \times 3.14 \times 16 \left((20)^2 + (8)^2 + 20 \times 8\right)$ 1 m

$= \frac{1}{3} \times 3.14 \times 16 \times 624$ 1 m

$= 10449.9\ \text{cm}^3$ or $10.45\ \ell$ 1 m

Cost of milk = 10.45 × 30 = Rs. 313.5 or Rs. 314 (approx) 1 m

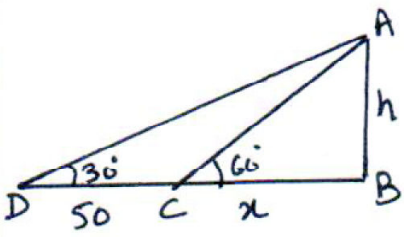
27. 

Figure .... 1 m

$\tan 60^\circ = \frac{h}{x}$

$h = x\sqrt{3}$ 1 m

$\tan 30^\circ = \frac{h}{50 + x}$

$3x = 50 + x$

$x = 25$ 1 m

Height of chimney $= 25\sqrt{3} = 25 \times 1.732 = 43.3$ m ½ m

No, chimney is not controlling pollution according to the rules ½ m

28. $\frac{1}{2x+1} + \frac{2}{7x+1} = \frac{4}{5x+2}$

$\frac{7x+1+4x+2}{(2x+1)(7x+1)} = \frac{4}{5x+2}$ 1 m

$(11x + 3)\ (5x + 2) \ = \ 56x^2 + 36x + 4$

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

$x^2 - 2x + x - 2 \ = \ 0$ 2 m

$x = 2, -1$ 1 m

29. Let the speed of train be x km/h ½ m

$$\frac{360}{x} - \frac{360}{x+5} = 1$$ 1½ m

On solving, $x^2 + 5x - 1800 = 0$ 1 m

$x^2 + 45x - 40x - 1800 = 0$

$x = 40$ 1 m

Speed of train = 40 km/h

30. For correct given, To prove, Construction, figure 4x½ = 2 m

For correct proof 2 m

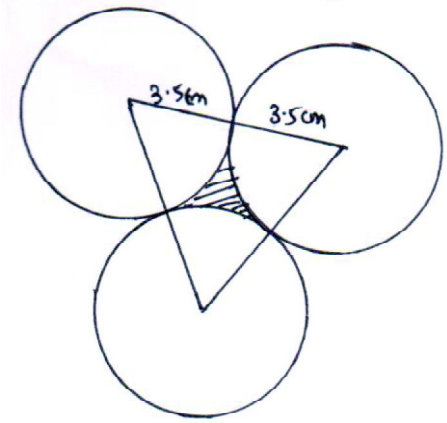
31. 

Figure.... ½ m

Area of required region

$$= \frac{\sqrt{3}}{4}(7)^2 - \frac{3\times 60}{360}\times\frac{22}{7}\times(3.5)^2$$ 1½ m

$$= \frac{49\times 1.732}{4} - \frac{38.5}{2}$$ 1½ m

$= 21.21 - 19.25 \ = \ 1.96\ cm^2$ ½ m