KENDRIYA VIDYALAYA SANGATHAN, REGIONAL OFFICE LUCKNOW

MARKING SCHEME

Time: Subject: Mathematics-Standard (041)

Time Allowed: 3 Hours **Maximum Marks: 80**

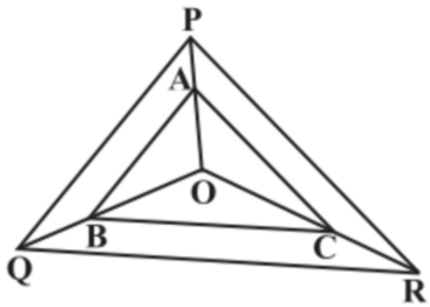
General Instructions:

1.This question paper has 5 sections A-E
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. section E has 3 case based integrated units of assessment (04 marks each) with sub parts of the values 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Qs of 2 marks has been provided. An internal choice has been provided in 2 marks questions of section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$,wherever required if not stated.

Q. No.	**Section-A**	**Marks**
1	d) cylinder and cone	1
2	a) 90^0	1
3	b) 128	1
4	c) $\frac{\theta}{360^0} \times \pi r^2$	1
5	c) degree	1
6	c) no solution	1
7	b) $x(x + 1) + 8 = (x + 2)(x - 2)$	1
8	b) 48	1
9	c) -1, -4, -7, -10, . . .	1
10	d) 3	1
11	a) 3	1
12	c) 5	1
13	*d)* $\angle A = \angle E$	1
14	b) 35	1
15	$a) \frac{3}{26}$	1
16	d) 90^0	1
17	a)2	1
18	c) 40^0	1
19	a)Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).	1
20	d)Assertion (A) is false but reason (R) is true.	1

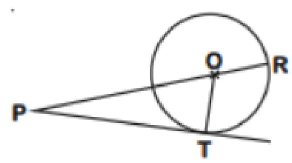
<table>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>Section-B</td><td></td></tr>
<tr><td>21</td><td>We have, $1 \times 2 \times 3 \times 4 \times 5 + 3 = 3\times(1\times2\times4\times5\ +\ 1)$
$=3\times(40\ +\ 1) =\ 13\times(41)$
$=\ 13\times41\times1$
Since given number has more than two factors, therefore it is a composite number.
OR
2 | 270
3 | 135
3 | 45
3 | 15
5 | 5
  | 1
Therefore, $270= \ 2\times3\times3\times3\times5$</td><td>½
½
½
½

1

1</td></tr>
<tr><td>22</td><td>
Given here,
In ΔOPQ, AB || PQ
By using Basic Proportionality Theorem,
OA/AP = OB/BQ…………….(i)
Also given,
In ΔOPR, AC || PR
By using Basic Proportionality Theorem
∴ OA/AP = OC/CR……………(ii)
From equation (i) and (ii), we get,
OB/BQ = OC/CR
Therefore, by converse of Basic Proportionality Theorem,
In ΔOQR, BC || QR.</td><td>1/2

1/2

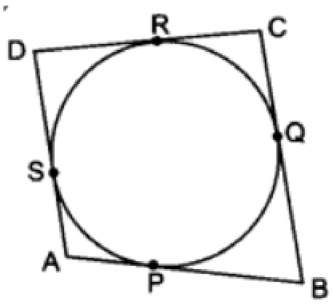
½

½</td></tr>
<tr><td>23</td><td>For using Pythagoras theorem and finding OP = 25 cm
For finding PR = OP + OR = 25 cm + 7 cm = 32 cm
</td><td>1
1</td></tr>
<tr><td>24</td><td>For using Pythagoras theorem
For finding $cos^2 A\ +\ sin^2 A\ =\ 1$

OR
$LHS\ =\frac{1+secsec\ A}{secsec\ A} = \frac{1+\frac{1}{coscos\ A}}{\frac{1}{coscos\ A}} = \frac{A+1)/coscos\ A}{1/coscos\ A} =\ \cos cos\ A\ +\ 1$
$and\ RHS\ = \frac{sin^2 A}{1-coscos\ A} = \frac{1-cos^2 A}{1-coscos\ a} = \frac{(1-coscos\ A)(1+cosA)}{(1-coscos\ A)} =\ 1\ +\ \cos cos\ A$</td><td>1
1

1</td></tr>
</table>

	∴ LHS = RHS, hence proved.	1
25	The largest possible sphere that can be carved out of a sphere, is equal to the diameter of the sphere. ∴Diameter of sphere = side of cube =7 cm So radius of sphere = 3.5 cm	1 1
	Section-C	
26	Let us assume, that √5 is rational number. i.e. √5 = x/y (where, x and y are co-primes) y√5= x Squaring both the sides, we get, ⇒$5y^2 = x^2$………………………………….. (1) Thus, x^2 is divisible by 5, so x is also divisible by 5. Let us say, x = 5k, for some value of k and substituting the value of x in equation (1), we get, $5y^2 = (5k)^2$ ⇒$y^2 = 5k^2$ ⇒y^2 is divisible by 5 it means y is divisible by 5. Clearly, x and y are not co-primes. Thus, our assumption about √5 is rational is incorrect. Hence, √5 is an irrational number.	½ ½ 1 1
27	No. of red balls = 3 No. of blue balls = 5 Total no of balls in the bag=3+5 =8 a) P(red ball) =$\frac{3}{8}$ b) P(yellow ball) = $\frac{0}{8} = 0$ c) P(not green ball) = $\frac{8}{8} = 1$	1 1 1
28	Formation of correct equations using given conditions For correct solution of equations using any method There are two such numbers: 42 and 24 **OR** $3x - 3y = -7$ ………………………..(1) $x - 4y = -19$ ………………………... (2) Multiplying equation(2) by 3 and subtracting from equation(1) $3x - 2y = -7$ $3x - 12y = -57$ -…+………+………. $10y = 50$ ⇒$y = 5$, Putting the value of y in equation (1) we get , $3x - 2\times5 = -7$ ⇒$3x = -7 + 10$	1 1 1 1

	$\Rightarrow 3x = 3 \Rightarrow x = 1$ Now putting the values of x and y in equation $y = mx + 3$, we get $m = 2$	1 1
29	The figure given is:  From this figure we can conclude a few points which are: (i) DR = DS (ii) BP = BQ (iii) AP = AS (iv) CR = CQ Since they are tangents on the circle from points D, B, A, and C respectively. Now, adding the LHS and RHS of the above equations we get, DR+BP+AP+CR = DS+BQ+AS+CQ By rearranging them we get, (DR+CR) + (BP+AP) = (CQ+BQ) + (DS+AS) By simplifying, AD+BC= CD+AB	1 1 1
30	$LHS = \frac{\mathrm{cotcot}\,A - \mathrm{coscos}\,A}{\mathrm{cotcot}\,A + \mathrm{coscos}\,A} = \frac{\frac{\mathrm{coscos}\,A}{\mathrm{sinsin}\,A} - \mathrm{coscos}\,A}{\frac{\mathrm{coscos}\,A}{\mathrm{sinsin}\,A} + \mathrm{coscos}\,A}$ $= \frac{\mathrm{coscos}\,A\left(\frac{1}{\mathrm{sinsin}\,A} - 1\right)}{\mathrm{coscos}\,A\left(\frac{1}{\mathrm{sinsin}\,A} + 1\right)}$ $= \frac{\left(\frac{1}{\mathrm{sinsin}\,A} - 1\right)}{\left(\frac{1}{\mathrm{sinsin}\,A} + 1\right)}$ $= \frac{cosec\,A - 1}{cosec\,A + 1}$ **OR** LHS=$\sqrt{\frac{1+\mathrm{sinsin}\,A}{1-\mathrm{sinsin}\,A}} = \sqrt{\frac{1+\mathrm{sinsin}\,A}{1-\mathrm{sinsin}\,A}} \times \sqrt{\frac{1+\mathrm{sinsin}\,A}{1+\mathrm{sinsin}\,A}}$ $= \sqrt{\frac{(1+\mathrm{sinsin}\,A)^2}{1-sin^2 A}}$ $= \frac{1+\mathrm{sinsin}\,A}{\mathrm{coscos}\,A}$	1 1 1 1

$= \frac{1}{cos\,A} + \frac{sin\,A}{cos\,A}$

A + tan $tan\,A$ = RHS 1

1

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31 Given $a_3 = 5 \Rightarrow a + 2d = 5$ ………..(1) 1/2

and $a_7 = 9 \Rightarrow a + 6d = 9$ ………..(2) 1/2

solving these equations we get, d=1 , $a = 3$ 1

thus required AP is 3, 4, 5, 6, ……. 1

Section-D

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32 Volume of ice=cream in the cylinder = $\pi R^2 H$ 1

$= \pi \times (6)^2 \times 15$ cm^2 1

And Volume of ice-cream in one cone = $\frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$

$= \frac{1}{3}\pi r^2 \times 4r + \frac{2}{3}\pi r^3$ $(\because h = 4r)$ 2

$= 2\pi r^3$

$\Rightarrow 10\times\ 2\pi r^3 = \pi \times (6)^2 \times 15$ cm^2 1

$\Rightarrow r^3 = 3^3$

$\Rightarrow r = 3\ cm$

33

Monthly consumption	65-85	85-105	105-125	125-145	145-165	165-185	185-205
No. of customers	4	5	13	20	14	8	4
Cumulative frequency	4	9	22	42	56	64	68

For correct cumulative frequency table

For finding correct median class: 125-145

For using correct formula and substituting correct values 1

$$Median = l + \frac{\frac{N}{2} - CF}{f} \times h$$ 1

= 125 + [(34 − 22)/20] × 20

= 125 + 12 1

= 137 1

Therefore, median = 137

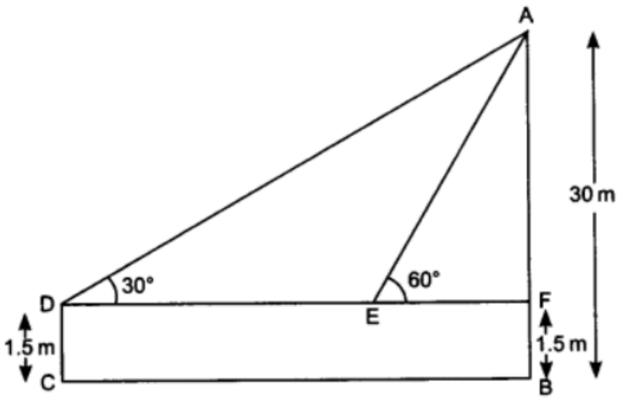
OR 1

	For finding modal class :(3-5)	
	For using correct formula of mode:	1
	Mode = $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$	
	For substituting correct values in the formula	
	$Mode = 3 + \left(\frac{8-7}{2\times8-7-2}\right)$	$1\frac{1}{2}$
	$= 3 + \frac{2}{7} = 3.286$	
		$1\frac{1}{2}$
		1
34	For correct statement	1
	Given, to prove, construction, figure	2
	For correct proof	2
35	For correct figure	1
	For correct values of trigonometric ratios	1
	For finding correct height of the tower, h = $20(\sqrt{3} - 1)\ m$	3
	OR	
		1
		1
		1
		1
		1

Let AB = height of the building

Given: $\angle ADF = 30^\circ$, $\angle AEF = 60^\circ$

$$AF = AB - FB \quad [\because CD = BF]$$
$$= 30\text{ m} - 1.5\text{ m} = 28.5\text{ m}$$



In ΔAFE,

$$\frac{AF}{EF} = \tan 60^\circ$$
$$\Rightarrow \frac{28.5}{EF} = \sqrt{3}$$
$$\Rightarrow EF = \frac{28.5}{\sqrt{3}}\text{ m}$$

In ΔAFD,

$$\frac{AF}{DF} = \tan 30^\circ$$
$$\Rightarrow \frac{28.5}{DF} = \frac{1}{\sqrt{3}}$$
$$\Rightarrow DF = 28.5\sqrt{3}\text{ m}$$

The distance walked by the boy towards building

$$DE = DF - EF$$
$$= 28.5\sqrt{3} - \frac{28.5}{\sqrt{3}} = \frac{28.5 \times 3 - 28.5}{\sqrt{3}} = \frac{28.5(3-1)}{\sqrt{3}}$$
$$= \frac{28.5 \times 2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{57\sqrt{3}}{3} = 19\sqrt{3}\text{ m}$$

Section-E

36 **Case-study-1** — 1+1+2

a) k = 48

b) 2 seconds

c) p(t) = $t^2 - t - 6$

OR

$$p(x) = x^2 - (sum\ of\ zeroes)x + product\ of\ zeroes$$
$$\Rightarrow p(x) = x^2 - (-3)x + 2$$
$$\Rightarrow p(x) = x^2 + 3x + 2$$

37 **Case-study-2** — 1+1+2

a) The point on x-axis which is equidistant from I and E is (1/2,0)

b) The point on y-axis which is equidistant from B and C is (0,1)

c) Coordinates of player Q are (0, 1)

OR

Coordinates of the position of player P are (2, 3/2)

38 **Case-study-3** — 1+1+2

a) Since number of rows were equal to the number of seats in each row in original arrangement, total seats are x^2 . In new arrangement row are $2x$ and seats in each row are $-\ 10$. Total seats are 300 more than previous seats so total number of seats are $(2x)(x - 10)$

thus, $(2x)(x - 10) = x^2 + 300$

$\Rightarrow x^2 - 20x - 300 = 0$

b) We have

$x^2 - 20x - 300 = 0$

$\Rightarrow x^2 - 30x + 10x - 300 = 0$

$\Rightarrow x(x - 30) + 10(x - 30) = 0$

$\Rightarrow (x - 30)(x - 10) = 0$

$\Rightarrow x = - 10 , 30$

Number of rows in the original arrangement = 30

c) Number of seats in original arrangement, $= x^2 = 30^2 =$ = 900

OR

Total seats in rearrangement $30^2 + 300$ = 900 + 300 = 1200