S.S.C. PUBLIC EXAMINATIONS, MARCH-2019

MATHEMATICS

PAPER - I

PRINCIPLES OF VALUATION

General Instructions :

1. *Any logical method is valid.*
2. *If a candidate exceeds choice all answers have to be valued. The answer securing highest marks should be taken into account and the others should be marked as "Excess".*
3. *Wrong answer should be struck off and "0" (Zero) marks should be awarded.*
4. *Marks should be awarded according to the logical sequential steps.*
5. *Final answer is not the criteria for awarding marks.*
6. *Page wise marks should be noted in brackets otherwise write nil.*
7. *While entering the total marks fraction should be rounded off to the next integer.*

SECTION - I

1. $A = \{2^n / n \in N \text{ and } n < 5\}$ **1 M**

2.
$$\log_5 \sqrt{625} = \log_5 25$$
$$= \log_5 5^2$$ **$^1/_2$ M**
$$= 2\log_5 5$$
$$= 2 \times 1 = 2$$ **$^1/_2$ M**

1 M

3. Let the required supplementary angles be x and y.

$\therefore x + y = 180°$ ———— (1)

The larger angle exceeds the smaller by 58° **$^1/_2$ M**

$\therefore x - y = 58°$ ———— (2)

For solving (1) and (2)

and Finding $x = 119°$ and $y = 61°$. **$^1/_2$ M**

1 M

4. Radius of cylinder (r) = 7 cm

height (h) = 10 cm

Curved surface Area of cylinder = $2\pi rh$ } **$^1/_2$ M**

= $2\times\frac{22}{7}\times7\times10$ } **$^1/_2$ M**

= 440 cm^2

1 M

SECTION - II

5. Let Rohan's age at present be 'x' years } **$^1/_2$ M**

His mother's age at present is (x + 26) years

After three years, Rohan's age = (x + 3) years } **$^1/_2$ M**

After three years, His mother's age = x + 26 + 3 = (x + 29) years

The product of their ages after 3 years = (x + 3) (x + 29) } **$^1/_2$ M**

= $x^2 + 32x + 87$

By the sum, the product of their ages = 360 } **$^1/_2$ M**

$\therefore x^2 + 32x + 87 = 360$

$\Rightarrow x^2 + 32x - 273 = 0$

Which is the required quadratic equation.

2 M

6. Given polynomial is $x^2 - x - 30$

To find zeroes, $x^2 - x - 30 = 0$ say

$\Rightarrow x^2 - 6x + 5x - 30 = 0$ — **$^1/_2$ M**

$\Rightarrow (x - 6)(x + 5) = 0$

$\Rightarrow x = 6$ or $x = -5$ — **$^1/_2$ M**

Sum of the zeroes $= 6 + (-5) = 1 = \frac{-(-1)}{1} = \frac{-(\text{Coefficient of } x)}{\text{Coefficient of } x^2}$ — **$^1/_2$ M**

Product of the zeroes $= 6(-5) = -30 = \frac{-30}{1} = \frac{\text{Constant term}}{\text{Coefficient of } x^2}$ — **$^1/_2$ M**

2 M

7. Base radius of conical shape cap (r) = 7 cm.

height (h) = 24 cm.

Slant height (l) $= \sqrt{r^2 + h^2}$

$= \sqrt{7^2 + 24^2}$

$= \sqrt{49 + 576}$

$= \sqrt{625} = 25$ cm. — **$^1/_2$ M**

Area of Sheet required to make a cap = Lateral surface area of the cap
= $\pi r l$ } $\frac{1}{2}$ M

= $\frac{22}{7} \times 7 \times 25$
= 550 sq.cm. } $\frac{1}{2}$ M

Area of Sheet required to make 10 such caps = 10×550
= 5500 sq.cm. } $\frac{1}{2}$ M

2 M

8. Given numbers are 1260, 1440

$1440 = 1260 \times 1 + 180$
$1260 = 180 \times 7 + 0$ } $1\frac{1}{2}$ M

H.C.F. of 1260, 1440 is 180. $\frac{1}{2}$ M

2 M

9. First term of A.P. is $a = 10$

Let common difference $= d$

Sum of first 15 terms is $S_{15} = 675$

$\therefore \frac{15}{2}[2a + 14d] = 675$

$\Rightarrow [2 \times 10 + 14d] = \frac{675 \times 2}{15} = 90$ **1 M**

$\Rightarrow 14d = 90 - 20 = 70$

$\Rightarrow d = \frac{70}{14} = 5$

25^{th} term in that A.P. is $a_{25} = a + 24d$

$= 10 + 24 \times 5$

$= 10 + 120$ **1 M**

$= 130$

2 M

SECTION - III

10 a) Let us assume, the contrary,

that $2+5\sqrt{3}$ is rational. **1 M**

i.e., we can find co-primes 'a' and 'b', $b \neq 0$

such that $2+5\sqrt{3}=\frac{a}{b}$

$$\Rightarrow 5\sqrt{3}=\frac{a}{b}-2$$

$$\Rightarrow \sqrt{3}=\frac{a}{5b}-\frac{2}{5}$$ **2 M**

Since $\frac{a}{5b}$ and $\frac{2}{5} \in Q \Rightarrow \frac{a}{5b}-\frac{2}{5} \in Q$

and so $\sqrt{3}$ is rational.

But this contradicts the fact that $\sqrt{3}$ is irrational.

So, Our assumption that $2+5\sqrt{3}$ is rational is wrong. **$^1/_2$ M**

So, we conclude that $2+5\sqrt{3}$ is irrational. **$^1/_2$ M**

4 M

(OR)

10 b) From the given A.P. : 22, 15, 8, 1, ...

$a = 22, d = -7$ — **1 M**

n^{th} term of an A.P. $= a_n = a + (n - 1) d$

In this A.P. let n^{th} term be –321 — **1 M**

$\Rightarrow \quad a + (n - 1) d = -321$

$\Rightarrow \quad 22 + (n - 1)(-7) = -321$

$\Rightarrow \quad (n - 1)(-7) = -343$ — **$1^1/_2$ M**

$\Rightarrow \quad n - 1 = \frac{-343}{-7} = 49$

$\Rightarrow \quad n = 49 + 1 = 50$

$\therefore$ –321 will be the 50^{th} term in the given A.P. — **$^1/_2$ M**

4 M

11 a) Given that the sum of Moulika's marks in mathematics and English is 30.

Let the marks of Moulika in Mathematics = x

and that in English = 30 – x. **$^1/_2$ M**

If she got 2 marks more in Mathematics then marks in Maths = x + 2

and she got 3 marks less in English then the marks in English = 30 – x – 3 = 27 – x **$^1/_2$ M**

Product of these two = (x + 2) (27 – x) = 210

$\Rightarrow x^2 - 25x + 156 = 0$

$\Rightarrow (x - 12)(x - 13) = 0$

$\Rightarrow x = 12, x = 13$ **2 M**

Case : (1) If x = 12, the marks of Moulika

in Mathematics = 12

in English = 30 – 12 = 18 **$^1/_2$ M**

Case : (2) If x = 13, the marks of Moulika

in Mathematics = 13

in English = 30 – 13 = 17 **$^1/_2$ M**

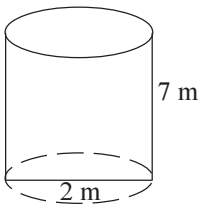
4 M

(OR)

11 b) The diameter of the oil drum which is in the shape of cylinder = d = 2m

Radius of the drum = $r = \frac{d}{2} = 1$ m

height = h = 7 m.



$^1/_2$ M

Total Surface Area of the drum which is in the shape of a cylinder $= 2\pi r(r + h)$

$^1/_2$ M

$$= 2 \times \frac{22}{7} \times 1 \times (1 + 7)$$

$$= 2 \times \frac{22}{7} \times 8$$

$$= \frac{352}{7}$$

$$= 50.28 \text{ sq.m.}$$

1 $^1/_2$ M

Charges to paint the drum per sq.m. = ₹ 5

Total cost of painting 10 such type of drums = 50.28 × 5 × 10

= ₹ 2514

1 $^1/_2$ M

4 M

12 a) A = {1, 2, 3, 4, 5} — $^1/_2$ M

B = {2, 3, 5} — $^1/_2$ M

C = {1, 3, 5, 7, 9} — $^1/_2$ M

D = {2, 4, 6, 8, 12, 16, 24, 48} — $^1/_2$ M

i) $A \cup B = \{1, 2, 3, 4, 5\} \cup \{2, 3, 5\} = \{1, 2, 3, 4, 5\}$ — $^1/_2$ M

ii) $B \cap C = \{2, 3, 5\} \cap \{1, 3, 5, 7, 9\} = \{3, 5\}$ — $^1/_2$ M

iii) $A - D = \{1, 2, 3, 4, 5\} - \{2, 4, 6, 8, 12, 16, 24, 48\}$
$= \{1, 3, 5\}$ — $^1/_2$ M

iv) $D - B = \{2, 4, 6, 8, 12, 16, 24, 48\} - \{2, 3, 5\}$
$= \{4, 6, 8, 12, 16, 24, 48\}$ — $^1/_2$ M

4 M

(OR)

12 b) Let the cost of one pencil = ₹ x
Cost of one Note Book = ₹ y — $^1/_2$ M

Total cost of 6 pencils and 4 Note Books = ₹ 90
$\Rightarrow 6x + 4y = 90$ ———— (1) — 1 M

Total cost of 8 pencils and 3 Note Books = ₹ 85
$\Rightarrow 8x + 3y = 85$ ———— (2) — 1 M

(1) : $6x + 4y = 90$

(2) : $8x + 3y = 85$

Solving these equations to find x = 5, y = 15
and writing the cost of one pencil = ₹ 5
the cost of one Note Book = ₹ 15 — 1 $^1/_2$ M

4 M

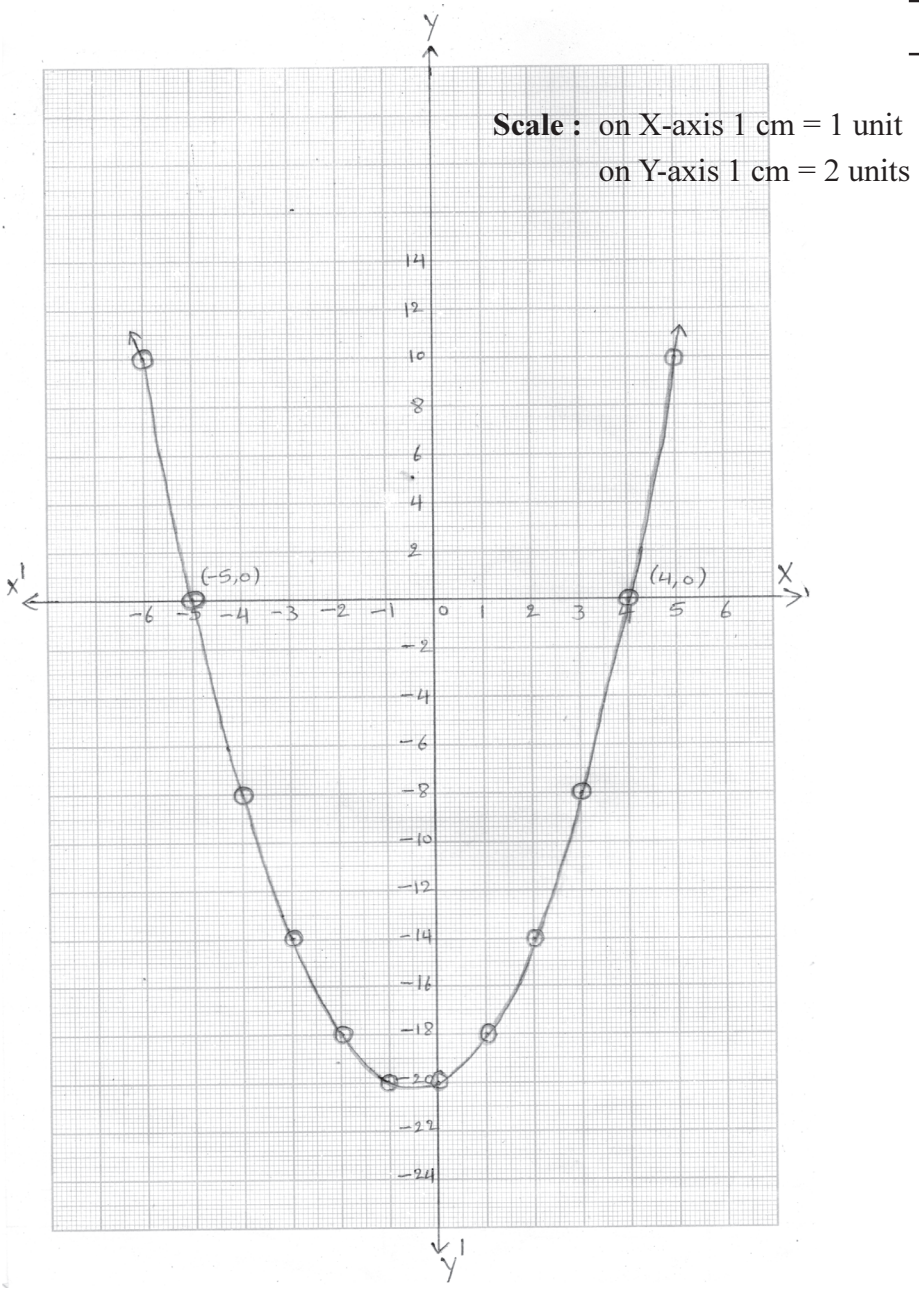
13 a) Let $y = x^2 + x - 20$ — **$^1/_2$ M**

For finding the points of $y = x^2 + x - 20$ — **$1^1/_2$ M**

For plotting the points and draw parabola — **$1^1/_2$ M**

For writing zeroes of the polynomial are 4 and –5 — **$^1/_2$ M**

4 M



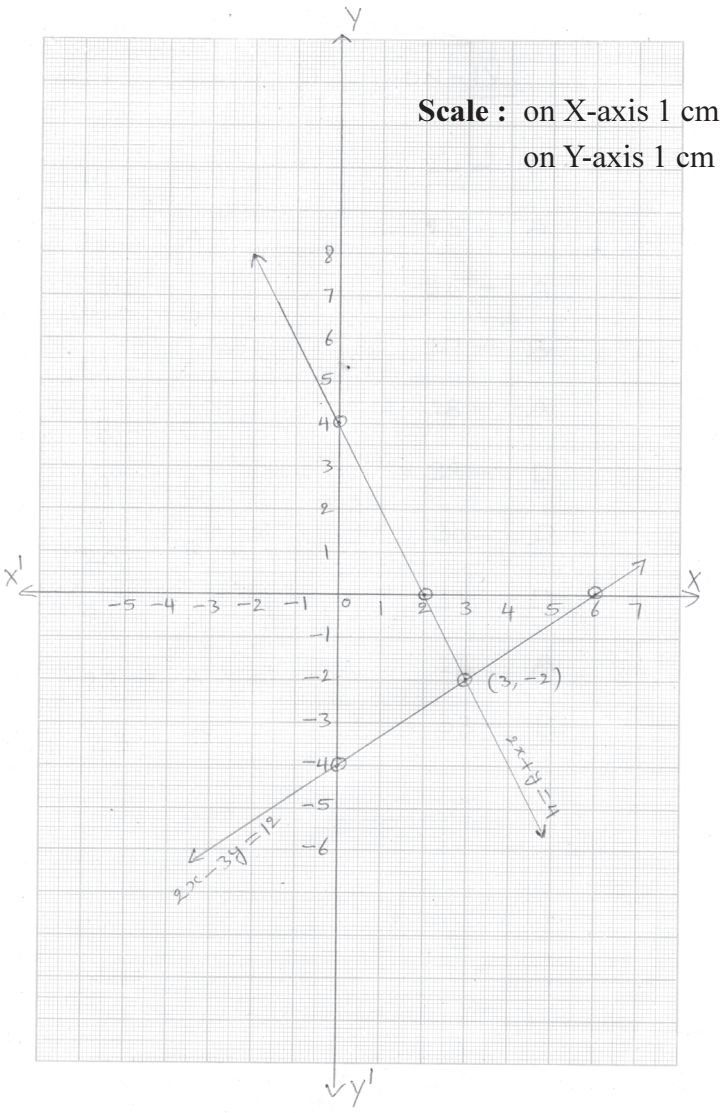
(OR)

13b) For finding, the points and drawing the graph of $2x + y = 4$ — **$1\frac{1}{2}$ M**

For finding the points and drawing the graph of $2x - 3y = 12$ — **$1\frac{1}{2}$ M**

For finding the solution $x = 3$ and $y = -2$ — **1 M**

4 M



PART - B

$20 \times {}^{1}/_{2}$ M = 10 M

SECTION - IV

14.	C	24.	C
15.	A	25.	A
16.	B	26.	A
17.	C	27.	B
18.	C	28.	A
19.	B	29.	D
20.	B	30.	D
21.	D	31.	D
22.	A	32.	A
23.	D	33.	B