

PTA Model Question Paper – 3 Answer key (EM)  
2019 - 2020

Part - I

Answer all the questions	
1.	c) 12
2.	c) {1, -1}
3.	c) 14280
4.	b) 9
5.	a) The slope is 0.5 and the y - intercept is 2.6
6.	b) $36x^2y^2z^2$ (LCM)
7.	a) 1.4 cm
8.	d) 2
9.	b) $x + y = 3; 3x + y = 7$
10.	d) $\cot \theta$
11.	c) $3\pi$
12.	a) 3cm
13.	a) 0
14.	c) $\frac{23}{26}$

Part - II

15. TB : 21 (Example: 1.15 (ii))  
16. TB : 46 (Example: 2.9)  
17. TB : 63, WTS Guide : 50 (Ex. 2.5 - 8)  
18. Given  $1^3 + 2^3 + 3^3 + \dots + k^3 = 16900$

$$\left[\frac{k(k+1)}{2}\right]^2 = 16900$$

$$\frac{k(k+1)}{2} = \sqrt{16900}$$

$$1 + 2 + 3 + \dots + k = \sqrt{16900} = 130$$

19. TB : 142 (Example: 3.60)  
20. TB : 123, WTS Guide : 117 (Ex. 3.14 - 6)  
21. TB : 102, WTS Guide : 96 (Ex. 3.5 - 4)  
22. TB : 173 (Example: 4.16)  
23. TB : 217, WTS Guide : 208 (Ex. 5.2 - 2(ii))  
24. TB : 256 (Example: 6.26)  
25. TB : 294 (Example: 7.30)  
26. TB : 323, WTS Guide : 299 (Ex. 8.3 - 3(i))  
27. TB : 314 (Example: 8.15)  
28. Slope of  $3x - 5y + 7 = 0$  is

$$m_1 = \frac{-\text{coefficient of } x}{\text{coefficient of } y} = \frac{-3}{-5} = \frac{3}{5}$$

Slope of  $15x + 9y + 4 = 0$  is

$$m_2 = \frac{-\text{coefficient of } x}{\text{coefficient of } y} = \frac{-15}{9} = \frac{-5}{3}$$

$$m_1 \times m_2 = \frac{3}{5} \times \frac{-5}{3} = -1$$

The two straight lines are perpendicular.

Part - III

29. TB : 16 (Example: 1.11)  
30. TB : 26, WTS Guide : 19 (Ex. 1.4 - 11)

PTA Model Question Paper – 3 Answer key (TM)  
2019 - 2020

பகுதி - I

அனைத்து வினாக்களுக்கும் விடையளி	
1.	c) 12
2.	c) {1, -1}
3.	c) 14280
4.	b) 9
5.	a) சாய்வு 0.5 மற்றும் y - வெட்டுத்துண்டு 2.6
6.	b) $36x^2y^2z^2$
7.	a) 1.4 cm
8.	d) 2
9.	b) $x + y = 3; 3x + y = 7$
10.	d) $\cot \theta$
11.	c) $3\pi$
12.	a) 3செ.மீ
13.	a) 0
14.	c) $\frac{23}{26}$

பகுதி - II

15. TB : 22 (எகா. 1.15 (ii))  
16. TB : 47 (எகா. 2.9)  
17. TB : 64, WTS Guide : 48 (பயிற்சி 2.5 - 8)  
18.  $1^3 + 2^3 + 3^3 + \dots + k^3 = 16900$

$$\left[\frac{k(k+1)}{2}\right]^2 = 16900$$

$$\frac{k(k+1)}{2} = \sqrt{16900}$$

$$1 + 2 + 3 + \dots + k = \sqrt{16900} = 130$$

19. TB : 147 (எகா. 3.60)  
20. TB : 127, WTS Guide : 112 (பயிற்சி 3.14 - 6)  
21. TB : 106, WTS Guide : 92 (பயிற்சி 3.5 - 4)  
22. TB : 181 (எகா. 4.16)  
23. TB : 226, WTS Guide : 202 (பயிற்சி 5.2 - 2(ii))  
24. TB : 268 (எகா. 6.26)  
25. TB : 305 (எகா. 7.30)  
26. TB : 337, WTS Guide : 290 (பயிற்சி 8.3 - 3(i))  
27. TB : 327 (எகா. 8.15)

28.  $3x - 5y + 7 = 0$  ன் சாய்வு  $m_1 = \frac{-3}{-5} = \frac{3}{5}$

$15x + 9y + 4 = 0$  ன் சாய்வு  $m_2 = \frac{-15}{9} = \frac{-5}{3}$

$$m_1 \times m_2 = \frac{3}{5} \times \frac{-5}{3} = -1$$

ஆகவே, நேர்க்கோடுகள் ஒன்றுக்கொன்று செங்குத்து.

பகுதி - III

29. TB : 17 (எகா. 1.11)  
30. TB : 27, WTS Guide : 19 (பயிற்சி 1.4 - 11)

$$\begin{aligned}
 31. A &= \{x \in W \mid 0 < x < 5\} = \{1, 2, 3, 4\}, \\
 B &= \{x \in W \mid 0 \leq x \leq 2\} = \{0, 1, 2\}, \\
 C &= \{x \in W \mid x < 3\} = \{0, 1, 2\} \\
 B \cap C &= \{0, 1, 2\} \cap \{0, 1, 2\} = \{0, 1, 2\} \\
 A \times (B \cap C) &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), \\
 &\quad (2, 2), (3, 0), (3, 1), (3, 2), (4, 0), \\
 &\quad (4, 1), (4, 2)\} \dots \dots \dots (1) \\
 A \times B &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), (2, 2) \\
 &\quad (3, 0), (3, 1), (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 A \times C &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), (2, 2) \\
 &\quad (3, 0), (3, 1), (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 (A \times B) \cap (A \times C) &= \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \cap \\
 &\quad \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \dots (2)
 \end{aligned}$$

From (1) and (2),

$A \times (B \cap C) = (A \times B) \cap (A \times C)$  is verified.

32. TB : 77, WTS Guide : 69 (Ex. 2.8 - 7)

33. The sequence of 3 digit numbers which are divisible by 9 are 108,117,126,...999.

$$a = 108, d = 9, l = 999$$

$$\begin{aligned}
 n &= \frac{l-a}{d} + 1 = \frac{999-108}{9} + 1 = \frac{891}{9} + 1 \\
 &= 99 + 1 = 100
 \end{aligned}$$

$$S_n = \frac{n}{2}[a + l]$$

$$S_{100} = \frac{100}{2}[999 + 108] = 50(1107) = 55350$$

34. TB:106 (Example:3.22)

35. TB : 115, WTS Guide : 106 (Ex. 3.11 - 1(ii))

36. TB : 150, WTS Guide : 142 (Ex. 3.18 - 12)

37. TB : 183, WTS Guide : 178 (Ex. 4.3 - 5)

38. TB : 233, WTS Guide : 226 (Ex. 5.4 - 11)

39. TB : 248, WTS Guide : 241 (Ex. 6.1 - 7(ii))

40. TB : 273 (Example: 7.5)

41. TB : 328 (Example: 8.31)

$$\begin{aligned}
 31. A &= \{x \in W \mid 0 < x < 5\} = \{1, 2, 3, 4\}, \\
 B &= \{x \in W \mid 0 \leq x \leq 2\} = \{0, 1, 2\}, \\
 C &= \{x \in W \mid x < 3\} = \{0, 1, 2\} \\
 B \cap C &= \{0, 1, 2\} \cap \{0, 1, 2\} = \{0, 1, 2\} \\
 A \times (B \cap C) &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), \\
 &\quad (2, 2), (3, 0), (3, 1), (3, 2), (4, 0), \\
 &\quad (4, 1), (4, 2)\} \dots \dots \dots (1) \\
 A \times B &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), (2, 2) \\
 &\quad (3, 0), (3, 1), (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 A \times C &= \{1, 2, 3, 4\} \times \{0, 1, 2\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), (2, 1), (2, 2) \\
 &\quad (3, 0), (3, 1), (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 (A \times B) \cap (A \times C) &= \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \cap \\
 &\quad \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \\
 &= \{(1, 0), (1, 1), (1, 2), (2, 0), \\
 &\quad (2, 1), (2, 2), (3, 0), (3, 1), \\
 &\quad (3, 2), (4, 0), (4, 1), (4, 2)\} \dots (2)
 \end{aligned}$$

(1) மற்றும் (2) லிருந்து,

$A \times (B \cap C) = (A \times B) \cap (A \times C)$  என்பது சரிபார்க்கப்பட்டது.

32. TB : 79, WTS Guide : 69 (பயிற்சி 2.8 - 7)

33. 9ஆல் வகுப்படும் 3 இலக்க இயல் எண்கள் 108,117,126,...999.

$$a = 108, d = 9, l = 999$$

$$\begin{aligned}
 n &= \frac{l-a}{d} + 1 = \frac{999-108}{9} + 1 = \frac{891}{9} + 1 \\
 &= 99 + 1 = 100
 \end{aligned}$$

$$S_n = \frac{n}{2}[a + l]$$

$$S_{100} = \frac{100}{2}[999 + 108] = 50(1107) = 55350$$

34. TB:106 (எகா .3.22)

35. TB : 119, WTS Guide : 101 (பயிற்சி 3.11 - 1(ii))

36. TB : 155, WTS Guide : 137 (பயிற்சி 3.18 - 12)

37. TB : 191, WTS Guide : 172 (பயிற்சி 4.3 - 5)

38. TB : 219, WTS Guide : 69 (பயிற்சி 5.4 - 11)

39. TB : 259, WTS Guide : 233 (பயிற்சி 6.1 - 7(ii))

40. TB : 285 (எகா. 7.5)

41. TB : 343 (எகா. 8.31)

$$42. \bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{18+20+15+12+25}{5} = \frac{90}{5} = 18$$

$x$	$d = x - \bar{x}$	$d^2$
18	0	0
20	2	4
15	-3	9
12	-6	36
25	7	49
		$\sum d^2 = 98$

$$\sigma = \sqrt{\frac{\sum d^2}{n}} = \sqrt{\frac{9.8}{5}} = \sqrt{19.6} = 4.427$$

$$C.V = \frac{\sigma}{\bar{x}} \times 100 = \frac{4.427}{18} \times 100 = \frac{442.7}{18} = 24.59$$

Part - IV

43. a) TB : 132, WTS Guide : 129 (Ex. 3.15 - 7)

b) Note that the given equation is not in the standard form of a quadratic equation

Consider

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$$

$$\frac{1}{x+1} = 2 \left[ \frac{2}{x+4} - \frac{1}{x+2} \right]$$

$$= 2 \left[ \frac{2x+4-x-4}{(x+4)(x+2)} \right]$$

$$\frac{1}{x+1} = 2 \left[ \frac{x}{(x+2)(x+4)} \right]$$

$$x^2 + 6x + 8 = 2x^2 + 2x$$

Thus, we have  $x^2 - 4x - 8 = 0$ , which is a quadratic equation.

Using the quadratic formula we get

$$x = \frac{4 \pm \sqrt{16 - 4(1)(-8)}}{2(1)}$$

$$= \frac{4 \pm \sqrt{48}}{2} = 2 + 2\sqrt{3} \text{ or } 2 - 2\sqrt{3}$$

Hence the solution set is  $\{2 + 2\sqrt{3}, 2 - 2\sqrt{3}\}$

44. a) TB : 175 (Example: 4.17)

b) TB : 171, WTS Guide : 165 (Ch. 4, Theorem 4)

$$42. \bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{18+20+15+12+25}{5} = \frac{90}{5} = 18$$

$x$	$d = x - \bar{x}$	$d^2$
18	0	0
20	2	4
15	-3	9
12	-6	36
25	7	49
		$\sum d^2 = 98$

$$\sigma = \sqrt{\frac{\sum d^2}{n}} = \sqrt{\frac{9.8}{5}} = \sqrt{19.6} = 4.427$$

$$C.V = \frac{\sigma}{\bar{x}} \times 100 = \frac{4.427}{18} \times 100 = \frac{442.7}{18} = 24.59$$

பகுதி - IV

43. a) TB : 137, WTS Guide : 124 (பயிற்சி 3.15 - 7)

b) கொடுக்கப்பட்ட சமன்பாடு ஒரு இருபடிசமன்பாடு வடிவமைப்பில் இல்லை.

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$$

$$\frac{1}{x+1} = 2 \left[ \frac{2}{x+4} - \frac{1}{x+2} \right]$$

$$= 2 \left[ \frac{2x+4-x-4}{(x+4)(x+2)} \right]$$

$$\frac{1}{x+1} = 2 \left[ \frac{x}{(x+2)(x+4)} \right]$$

$$x^2 + 6x + 8 = 2x^2 + 2x$$

$$x^2 - 4x - 8 = 0 \text{ என்ற}$$

பெறுகிறோம்.

இருபடி

சமன்பாட்டை

குத்திரத்தை

பயன்படுத்த,

$$x = \frac{4 \pm \sqrt{16 - 4(1)(-8)}}{2(1)}$$

$$= \frac{4 \pm \sqrt{48}}{2} = 2 + 2\sqrt{3} \text{ அல்லது } 2 - 2\sqrt{3}$$

தீர்வு கணம்  $\{2 + 2\sqrt{3}, 2 - 2\sqrt{3}\}$

44. a) TB : 183(எகா. 4.17)

b) TB : 179, WTS Guide : 160 (அலகு 4, தேற்றம் 4)