

Answer key and marking scheme

Semester II (2025-2026)

Subject :Mathematics (E)

Grade :9

Marks: 80

SECTION A

1. 5
2. 13
3. $x+y+6$
4. 5.6
5. 5
6. 9
7. 61
8. $a^c = b$
9. 36
10. 56
11. $2\sqrt{119}$
12. $x = 2y$
13. $2x - y = -4$
14. Q- exterior, R -Interior
15. 2:1
16. 48
17. 12
18. 144
19. Both assertion reason are true, reason explains assertion completely
20. Both assertion reason are true, reason does not explain assertion completely

Section B

21. In $\triangle AOB$ and $\triangle COD$

- | | | |
|---|--------------------------|-------------|
| 1) $OA = OC$ | } (Radii of same circle) | _____ (1/2) |
| 2) $OB = OD$ | | |
| 3) $\angle AOB = \angle COD$ (given) | | _____ (1/2) |
| 4) $\triangle AOB \cong \triangle COD$ (SAS test) | | _____ (1/2) |
| 5) $AB = CD$ (CPCT) | | _____ (1/2) |

22. $h = 35 \text{ cm} = 350 \text{ mm}$, $D = 7 \text{ cm} = 70 \text{ mm}$, $r = 35 \text{ mm}$, $R = 35 + 5 = 40 \text{ mm}$

$$V(\text{iron in pipe}) = \pi h (R^2 - r^2)$$

$$= \frac{22}{7} \times 350 (40^2 - 35^2) \quad (1)$$

$$= 22 \times 50 \times 75 \times 5 \quad (1/2)$$

$$= 412500 \text{ mm}^3 \quad (1/2)$$

$$\text{or } = 412.5 \text{ cm}^3$$

$$23. V(\text{sphere}) = \frac{4}{3} \pi r^3$$

$$288\pi = \frac{4}{3} \pi r^3 \quad (1/2)$$

$$\frac{288 \times 3}{4} = r^3 \quad (1/2)$$

$$r = \sqrt[3]{216} = 6 \text{ cm} \quad (1/2)$$

$$D = 12 \text{ cm} \quad (1/2)$$

OR

$$\text{TSA}(\text{hemisphere}) = 3\pi r^2$$

$$1848 = 3 \times \frac{22}{7} \times r^2 \quad (1/2)$$

$$\frac{1848 \times 7}{66} = r^2 \quad (1/2)$$

$$r = \sqrt{196} = 14 \text{ cm} \quad (1/2)$$

$$D = 28 \text{ cm} \quad (1/2)$$

$$24. 1) A(0,5) \quad (1/2)$$

$$2) -4 + 0 = -4 \quad \left(\frac{1}{2} + \frac{1}{2} \right)$$

$$3) 7 \text{ units} \quad (1/2)$$

$$25. 1) \frac{1}{2} \times 3.4325 = 1.71625 \quad (1)$$

$$2) 270.7 \quad (1)$$

$$26. s = \frac{25+25+30}{2} = 40 \quad (1/2)$$

$$A = \sqrt{40(15)(15)(10)}$$

$$= 15 \times 20 = 300 \text{ cm}^2 \quad (1/2)$$

$$\text{Area of design} = 30 \times 300 = 9000 \text{ cm}^2 \quad (1/2)$$

$$\text{Area of cloth of each colour} = 9000/3 = 3000 \text{ cm}^2 \quad (1/2)$$

$$27. m(\text{arc KB}) = 2 \times 120^\circ = 240^\circ \quad (\text{inscribed angle prop}) \quad (1/2)$$

$$m(\text{arc BNK}) = 360^\circ - 240^\circ = 120^\circ$$

$$\angle M = 120^\circ \quad (\text{central angle prop}) \quad (1/2)$$

$\angle M + \angle B + \angle N + \angle K = 360^\circ$ (angle sum prop of quadrilateral)

$$120 + \angle B + 120 + 40 = 360 \quad \text{_____} (1/2)$$

$$\angle B = 360^\circ - 280^\circ = 80^\circ \quad \text{_____} \left(\frac{1}{2}\right)$$

28. Let the number of rabbits be x and the number of pigeons be y

$$4x + 2y = 1060 \quad \text{_____} (1) \text{ or } 2x + y = 530$$

If $x = 146$

$$4 \times 146 + 2y = 1060$$

$$584 + 2y = 1060 \quad \text{_____} (1/2)$$

$$Y = \frac{476}{2} = 238 \quad \text{_____} (1/2)$$

The number of pigeons is 238.

$$29. \frac{x+5+2x-4}{2} = 29 \quad \text{_____} (1/2)$$

$$3x + 1 = 58 \quad \text{_____} (1/2)$$

$$X = \frac{57}{3} = 19 \quad \text{_____} (1/2)$$

$$\text{Fourth term} = x + 3 = 22 \quad \text{_____} (1/2)$$

30.

$$1) 0.5021$$

$$2) 0.1882$$

$$31. S = \frac{51+37+20}{2} = 54 \quad \text{_____} (1/2)$$

$$A = \sqrt{54(3)(17)(34)}$$

$$= 306 \text{ m}^2 \quad \text{_____} (1/2)$$

$$A(\text{parallelogram shaped farm}) = 2 \times 306 = 612 \text{ m}^2 \quad \text{_____} (1/2)$$

$$\text{Cost of levelling} = 12 \times 612 = \text{Rs. } 7344. \quad \text{_____} (1/2)$$

OR

$$S = \frac{30+30+48}{2} = 54 \quad \text{_____} (1/2)$$

$$A = \sqrt{54(24)(24)(6)}$$

$$= 432 \text{ m}^2 \quad \text{_____} (1/2)$$

$$A(\text{rhombus shaped field}) = 2 \times 432 = 864 \text{ m}^2 \quad \text{_____} (1/2)$$

$$A(\text{each cow to graze}) = \frac{864}{18} = 48 \text{ m}^2 \quad \text{_____} (1/2)$$

Section C

32. Finding 3 points _ _____ (1/2)

Plotting points on graph _____ (1/2 + 1/2 + 1/2)

Point of intersection with y axis (0,3) _____ (1)

33. Let the smallest side be x

Second side = x+4

Third side = 2x - 6

$$x+x+4+2x-6=50 \quad \text{_____}(1/2)$$

$$4x=52$$

$$x=13 \quad \text{_____}(1/2)$$

sides of triangle are 13 cm, 17 cm, 20 cm _____(1/2)

$$S=\frac{13+17+20}{2}=25 \quad \text{_____}(1/2)$$

$$A=\sqrt{25(5)(8)(12)} \quad \text{_____}(1/2)$$

$$=20\sqrt{30} \text{ cm}^2 \quad \text{_____}(1/2)$$

34. $m(\text{arc AD})=60^\circ$ (insc angle prop) _____(1/2)

$\angle AED=60^\circ$ (central angle prop) _____(1/2)

$\angle ABD=\angle ACD=30^\circ$ (angles insc in same arc) _____(1)

$\angle ABC=90^\circ$ (angle insc in semicircle) _____(1/2)

$\angle DBC=90^\circ-30^\circ=60^\circ$ _____(1/2)

OR

$m(\text{arc QTS})=110^\circ$ (central angle prop) _____(1/2)

$\angle QRS=55^\circ$ (ins angle prop) _____(1/2)

$\angle QTS=180-55=125^\circ$ (cyclic quadrilateral prop) _____(1)

Reflex $\angle QPS=360-110=250^\circ$ _____(1)

35.

Class interval	Tally marks	frequency
0-10	IIII	4
10-20	IIII II	7
20-30	IIII I	6
30-40	IIII I	6
40-50	IIII II	7
		30

36. $r+h=21$, $TSA=660$

$$TSA=2\pi r(r+h)$$

$$660=2 \times \frac{22}{7} \times r \times 21 \quad \text{_____}(1/2)$$

$$\frac{660 \times 7}{2 \times 22 \times 21} = r \quad \text{_____}(1/2)$$

$$r=5 \text{ cm} \quad \text{_____}(1/2)$$

$$h=21-5=16 \text{ cm} \quad \text{_____}(1/2)$$

$$\begin{aligned}\text{volume} &= \pi r^2 h \\ &= \frac{22}{7} \times 5 \times 5 \times 16 \quad \text{_____} (1/2) \\ &= \frac{8800}{7} = 1257.14 \text{ cm}^3 \quad \text{_____} (1/2)\end{aligned}$$

OR

$$\text{Height of cylinder} = 42 \times 5 = 210 \text{ mm} = 21 \text{ cm} \quad \text{_____} (1/2)$$

$$\begin{aligned}\text{Volume} &= \pi r^2 h \\ 1056 &= \frac{22}{7} \times r^2 \times 21 \quad \text{_____} (1/2) \\ \frac{1056 \times 7}{22 \times 21} &= r^2 \quad \text{_____} (1/2)\end{aligned}$$

$$r = \sqrt{16} = 4 \text{ cm} \quad \text{_____} (1/2)$$

$$\begin{aligned}\text{CSA} &= 2\pi rh \\ &= 2 \times \frac{22}{7} \times 4 \times 21 \quad \text{_____} (1/2) \\ &= 528 \text{ cm}^2 \quad \text{_____} (1/2)\end{aligned}$$

$$37. \text{ Let } x = 314.6 \times 0.0296$$

$$\begin{aligned}\log(x) &= \log(314.6) + \log(0.0296) \quad \text{_____} (1/2) \\ &= 2.4977 + \bar{2}.4713 \quad \text{_____} (1/2 + 1/2) \\ &= 0.9690 \quad \text{_____} (1/2)\end{aligned}$$

$$\begin{aligned}X &= \text{antilog}(0.9690) \quad \text{_____} (1/2) \\ &= 9.311 \quad \text{_____} (1/2)\end{aligned}$$

$$38. \text{ } r = 10 \text{ m}, h = 24 \text{ m}$$

$$\begin{aligned}l^2 &= r^2 + h^2 \\ l &= \sqrt{100 + 576} \quad \text{_____} (1/2) \\ l &= 26 \text{ m} \quad \text{_____} (1/2)\end{aligned}$$

$$\begin{aligned}\text{TSA to waterproof} &= \pi rl \\ &= 3.1 \times 10 \times 26 \quad \text{_____} (1/2) \\ &= 806 \text{ m}^2 \quad \text{_____} (1/2)\end{aligned}$$

$$\text{Number of containers for single coating} = \frac{806}{13} = 62 \quad \text{_____} (1/2)$$

$$\text{Containers required for double coating} = 62 \times 2 = 124 \quad \text{_____} (1/2)$$

39.

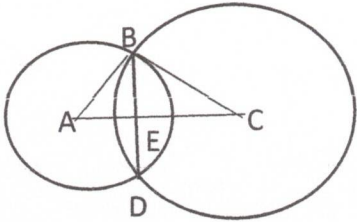
Amount saved in Rs (xi)	Number of students (fi)	fi x xi	
45	5	225	} 1/2
50	7	350	
55	6	330	} 1/2
60	3	180	
65	7	455	} 1/2
70	2	140	
	$\sum fi = \underline{30}$	$\sum fixi = \underline{1680}$	} $\frac{1}{2} + \frac{1}{2}$

Mean = $\frac{\sum fixi}{\sum fi} = \frac{1680}{30} = 56$ _____ (1/2)

40. In $\triangle AEB$

$AE^2 = AB^2 - BE^2$
 $= 100 - 64$ _____ (1/2)

$AE = \sqrt{36} = 6 \text{ cm}$ _____ (1/2)



In $\triangle CEB$

$CE^2 = CB^2 - BE^2$
 $= 289 - 64$ _____ (1/2)

$CE = \sqrt{225} = 15 \text{ cm}$ _____ (1/2)

Distance between the centres = $6 + 15 = 21 \text{ cm}$. _____ (1)

41. $r = 14 \text{ cm}$, $h = 72 \text{ cm}$, $l = 66 \text{ cm}$, $b = 28 \text{ cm}$, $h = ?$

$\pi r^2 h = l \times b \times h$ _____ (1/2)

$\frac{22}{7} \times 14 \times 14 \times 72 = 66 \times 28 \times h$ _____ (1/2 + 1/2))

$h = \frac{22 \times 14 \times 14 \times 72}{7 \times 66 \times 28}$ _____ (1/2)

$h = 24 \text{ cm}$. _____ (1/2)

The height of water level in the container is 24 cm. _____ (1/2)

42. Drawing of histogram _____ (2)

Drawing of frequency Polygon _____ (2)

43. 1) area cleaned by grp (A) = $\frac{1}{2} \times b \times h$
 $= \frac{1}{2} \times 24 \times 7$ _____(1/2)
 $= 84 \text{ m}^2$ _____(1/2)

2) $PR^2 = 24^2 + 7^2$

$PR = \sqrt{625} = 25 \text{ m}$ _____(1/2)

$S = \frac{25+12+17}{2} = 27$ _____(1/2)

Area cleaned by grp (B) = $\sqrt{27(2)(15)(10)}$ _____(1/2)

$= 90 \text{ m}^2$ _____(1/2)

3) Grp (B) cleaned a bigger area of $(90 - 84) = 6 \text{ m}^2$ _____(1/2)

4) Area of the ground = $84 + 90 = 174 \text{ m}^2$ _____(1/2)