

## SEE-2082 (2026)

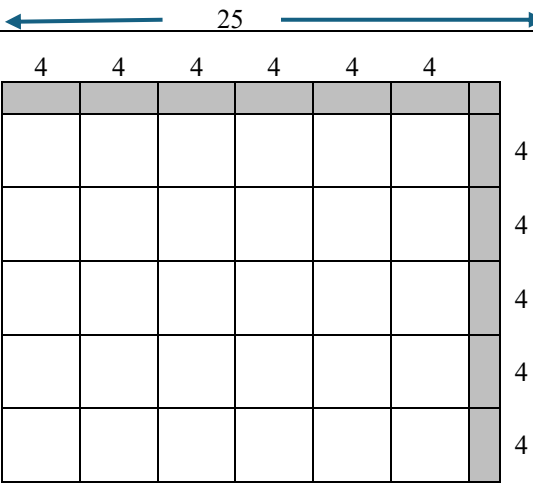
## अनिवार्य गणित

## उत्तरकुञ्जिका

अन्य बैकल्पिक तरिकाबाट समस्या समाधान गरेमा पनि अङ्क प्रदान गर्नुपर्ने छ । उत्तरकुञ्जिकामा प्रत्येक चरणको प्राप्ताङ्क १ भएतापनि विद्यार्थीहरूले आआंशिक समाधान गरेको अवस्थामा तथा सामान्य करा (जस्तै: एकाइ) छुट हुन गएमा समेत ०.५ अङ्क प्रदान गर्नुपर्नेछ ।

1. (a) $n(\overline{M \cup S}) = 12$	(1)
b.	(1)
(c) (i) $80 = 4x + 3x + 5 + 12$	(1)
(ii) $x = 9$	(1)
(iii) $n(M) = n_o(M) + n(M \cap S) = 4 \times 9 + 5 = 41$	(1)
(d) $n(M \cup S) : n(\overline{M \cap S}) = (4 \times 9 + 5 + 3 \times 9) : (80 - 5) = 68 : 75$	(1)
2. (a) (i) $P \left(1 + \frac{R}{100}\right)^2 = \text{Rs. } 14,580$ and $P \left(1 + \frac{R}{100}\right)^3 = \text{Rs. } 15,746.40$	(1)
(ii) $1 + \frac{R}{100} = 1.08$ (or equivalent)	(1)
(iii) $R = 8\%$ (or equivalent)	(1)
(b) $P \left(1 + \frac{8}{100}\right)^2 = \text{Rs. } 14,580 \quad \therefore P = \text{Rs. } 12,500$	(1)
(c) (i) $S.I. = \text{Rs. } 12,500 \times 1 \times 8 / 100 = \text{Rs. } 1,000$	
$Q.C.I. = \text{Rs. } 12,500 \left[ \left(1 + \frac{8}{400}\right)^4 - 1 \right] = \text{Rs. } 1030.40$	(1)
(ii) Q.C.I. is more than S.I. by Rs. 30.40.	(1)
3. (a) Compound depreciation = $V_0 \left[ 1 - \left(1 - \frac{R}{100}\right)^T \right]$	(1)
(b) The price of truck after 3 years = $\text{Rs. } 40,00,000 \left(1 - \frac{15}{100}\right)^3 = \text{Rs. } 24,56,500$	(1)
(c) (i) Total amount received = $\text{Rs. } 24,56,500 + \text{Rs. } 9,07,000 = \text{Rs. } 33,63,500$	
(ii) Loss = $\text{Rs. } 40,00,000 - \text{Rs. } 33,63,500 = \text{Rs. } 6,36,500$	(1)
Loss% = $\left(\frac{6,36,500}{40,00,000}\right) \times 100 = 15.91\%$	(1)

<b>4. (a)</b> Correct definition of Currency exchange rate.: A currency exchange rate is the value of one nation's currency in terms of another currency.	(1)
<b>(b)</b> NRs. 2,15,160 = \$ $\left(\frac{215160}{143.44}\right) = \$ 1,500$	(1)
<b>(c)</b> \$ 1,500 = NRs. $192.84 \times 1,500 = \text{NRs. } 2,14,260$	(1)
<b>5. (a)</b> Four triangular surfaces are in the square based pyramid.	(1)
<b>(b)</b> T.S.A. of pyramid = $(12)^2 + 2 \times 12 \times 10 = 384 \text{ cm}^2$	(1)
<b>(c)</b> (i) Height of pyramid (h) = $\sqrt{(10^2 - 6^2)} = 8 \text{ cm.}$	(1)
(ii) Volume of pyramid (V) = $\frac{1}{3} (12)^2 \times 8 = 384 \text{ cm}^3$	(1)
<b>6. (a)</b> radius (r) = $\sqrt{l^2 - h^2}$	(1)
<b>(b)</b> (i) Height of Conical part (h) = $54 - 30 = 24 \text{ cm.}$	(1)
radius (r) = $\sqrt{25^2 - 24^2} = 7 \text{ cm}$	(1)
(ii) Volume of solid object = $\left(\frac{22}{7}\right) (7)^2 \left(30 + \frac{1}{3} \times 24\right) = 5,852 \text{ cm}^3$	(1)
<b>(c)</b> $\pi r^2 l = 5852 \Rightarrow \left(\frac{22}{7}\right) (0.35)^2 \times l = 5852$ $\therefore l = 152 \text{ m.}$	(1)
<b>7. (a)</b> (i) Area of floor and 4 walls of the tank (A) = $(3 \times 2) + 2 \times 1.5(3 + 2)$	(1)
(ii) = $21 \text{ m}^2$	(1)
(iii) Total Cost = Rs. $1500 \times 21 = \text{Rs. } 31,500$	(1)
<b>(b)</b> (i) Volume of the tank (V) = $3\text{m} \times 2\text{m} \times 1.5\text{m} = 9 \text{ m}^3 = 9000 \text{ lit.}$	(1)
(ii) Cost to fill the tank = Rs. $0.25 \times 9000 = \text{Rs. } 2,250$	(1)
<b>8. (a)</b> A.M. = $(a + b) / 2$	(1)
<b>(b)</b> (i) $a + 4d = 23$ and $a + 9d = 43$	(1)
(ii) $d = 4$ and $a = 7$	(1)
<b>(c)</b> (i) $S_{10} = \left(\frac{10}{2}\right) [2 \times 7 + (10 - 1) \times 4]$	(1)
(ii) = $250$	(1)
<b>9. (a)</b> $x = \frac{(-b \pm \sqrt{b^2 - 4ac})}{2a}$	(1)
<b>(b)</b> (i) $l \times b = 525 \text{ m}^2$ and $b = l - 4\text{m}$	(1)
(ii) $l = 25 \text{ m.}$ and $b = 21 \text{ m.}$	(1)
<b>(c)</b> (i) The maximum number of pieces of the land of size $4\text{m} \times 4\text{m}$ along length is 6 and along breadth 5.	(1)
$\therefore$ Total number of pieces = $6 \times 5 = 30$	(1)

	(1)
<b>10. (a) (i)</b> $\frac{a-2b-a-2b}{a^2-4b^2} + \frac{2a}{4b^2-a^2}$	(1)
<b>(ii)</b> $-\frac{4b}{a^2-4b^2} - \frac{2a}{a^2-4b^2}$	(1)
<b>(iii)</b> $-\frac{2(a+2b)}{[(a+2b)(a-2b)]} = -\frac{2}{a-2b}$	(1)
<b>(b) (i)</b> $4^{x-2} = 2^{-1}$	(1)
<b>(ii)</b> $x = \frac{3}{2}$	(1)
<b>11. (a)</b> Area of Triangle = $\frac{1}{2}$ area of Parallelogram	(1)
<b>(b) (i)</b> $\triangle BCD = \frac{1}{2}$ of $\square BCDE$ and $\triangle ABC = \frac{1}{2}$ of $\square BCDE$	(1)
<b>(ii)</b> $\triangle BCD = \triangle ABC$	(1)
<b>12. (a)</b> The sum of opposite angles of the cyclic quadrilateral is supplementary.	(1)
<b>(b)</b> $2x + x = 180^\circ \therefore x = 60^\circ$	(1)
<b>(c) (i)</b> Correct two circles with naming.	(1)
<b>(ii)</b> Correct measurement with table and conclusion.	(1)
<b>(d) (i)</b> $\angle PQR + \angle POR = 2x + 2x = 4x = 4 \times 60^\circ = 240^\circ$	(1)
<b>(ii)</b> $\angle QPO + \angle QRO = 360^\circ - (\angle PQR + \angle POR) = 360^\circ - 240^\circ = 120^\circ$	(1)
<b>13. (a) (i)</b> Construction of rectangle MNOP according to given measurement.	(1)
<b>(ii)</b> Construction of NQ which is double of NO.	(1)
<b>(iii)</b> Construction of $\angle RNQ = 60^\circ$ and construct $\triangle NQR$ .	(1)
<b>(b)</b> Area of $\triangle NQR$ and area of rectangle MNOP are equal because the base of $\triangle NQR$ is double of the base of rectangle and both between same parallel lines.	(1)

<b>14. (a)</b> Correct any one example of angle of depression.	(1)
	(1)
(c) $\sin 60^\circ = CE / (105\sqrt{3} \text{ m.}) \Rightarrow CE = 157.5 \text{ m.}$	(1)
Height of the kite from the ground = $157.5 + 1.75 = 159.25 \text{ m.}$	
(d) $\sin 45^\circ = CE / (105\sqrt{3} \text{ m.}) \Rightarrow CE = 128.61 \text{ m.}$	(1)
Height of the kite from the ground = $128.61 + 1.75 = 130.36 \text{ m.}$	

**15.**

Height (In cm)	No. of Students (f)	c.f.
110 – 120	8	8
120 – 130	10	18
130 – 140	16	34
140 – 150	12	46
150 – 160	4	50
	<b>N = <math>\Sigma f = 50</math></b>	

**16.**

(a) $Mode = L + \left[ \frac{(f_1 - f_0)}{2f_1 - f_0 - f_2} \right] \times i$ , where the given symbols have their own meaning.	(1)
(b) (i) $f_1 = 16, f_0 = 10$ and $f_2 = 12$ , Mode class = 130 – 140	(1)
(ii) $Mode = 130 + \left[ \frac{(16 - 10)}{2 \times 16 - 10 - 12} \right] \times 10 = 136$	(1)
(c) (i) Position of $Q_3 = \frac{3}{4}(50)$ th item = (37.5)th item. $Q_3$ class = 140 – 150	(1)
(ii) Value of $Q_3 = 140 + [(37.5 - 34) / 12] \times 10 = 142.92 \text{ cm.}$	(1)
(d) The average height of students above model class = $\frac{(145 \times 12 + 155 \times 4)}{12 + 4} = 147.5 \text{ cm.}$	(1)

<b>16. (a)</b> $P(G \cup B) = P(G) + P(B) - P(G \cap B)$	(1)
	(2)
<b>(c)</b> $P(GG) \text{ or } P(BB) = \left(\frac{27}{50} \times \frac{26}{49}\right) + \left(\frac{23}{50} \times \frac{22}{49}\right) = \frac{604}{1225}$	(1)
<b>(d)</b> The probability of selecting both girls is less than the total probability = $1 - \left(\frac{27}{50} \times \frac{26}{49}\right) = \frac{874}{1225}$	(1)