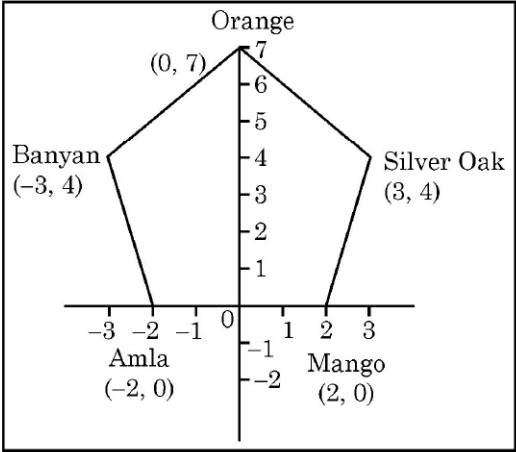
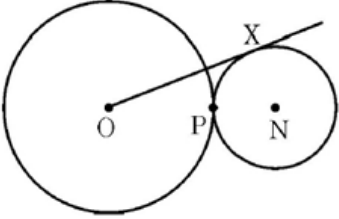
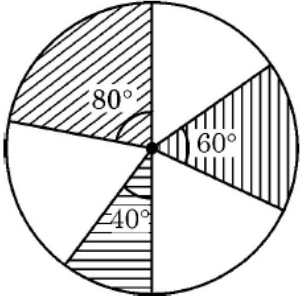


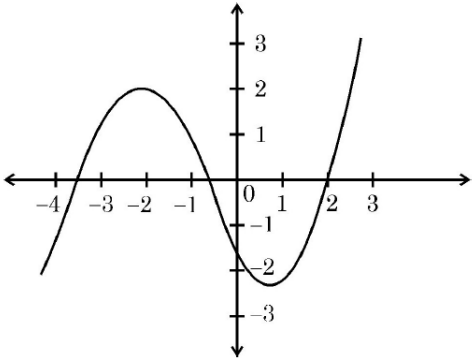
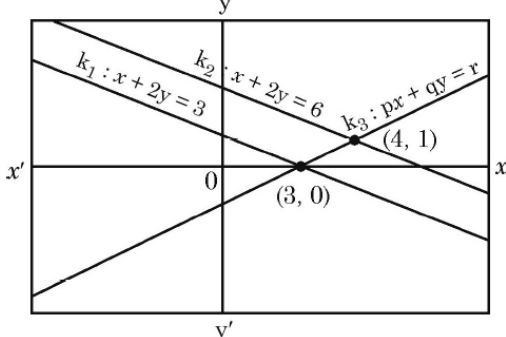
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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><b>Marking Scheme</b><br/> <b>Strictly Confidential</b><br/> <b>(For Internal and Restricted use only)</b><br/> <b>Secondary School Examination, 2026 (2<sup>nd</sup> Board Examination)</b><br/> <b>MATHEMATICS (STANDARD) (041) (PAPER CODE 30/8/2)</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b><u>General Instructions: -</u></b>                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1.                                                                                                                                                                                                                                                                                           | You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the Spot Evaluation Guidelines carefully.                                                                                                                                                                                                                                                                         |
| 2.                                                                                                                                                                                                                                                                                           | <b>“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. It’s leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and BNS.”</b>                                                                                                                                                                                             |
| 3.                                                                                                                                                                                                                                                                                           | Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. <b>However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In Class-X, while evaluating the Competency-based questions, please try to understand given answer and even if reply is not from Marking Scheme but correct competency is enumerated by the candidate, due marks should be awarded.</b> |
| 4.                                                                                                                                                                                                                                                                                           | The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5.                                                                                                                                                                                                                                                                                           | The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.                                                                                                                                                                                                                   |
| 6.                                                                                                                                                                                                                                                                                           | Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. <b>This is most common mistake which evaluators are committing.</b>                                                                                                                                                                                                                                                                                                                                                                                               |
| 7.                                                                                                                                                                                                                                                                                           | If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written on the left-hand margin and encircled. This may be followed strictly.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 8.                                                                                                                                                                                                                                                                                           | If a question does not have any parts, marks must be awarded on the left-hand margin and encircled. This may also be followed strictly.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

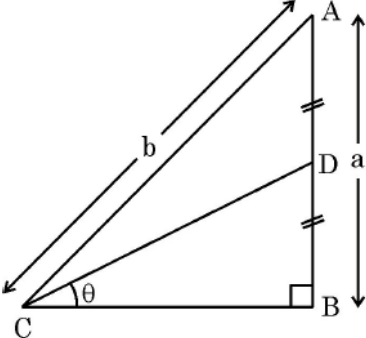
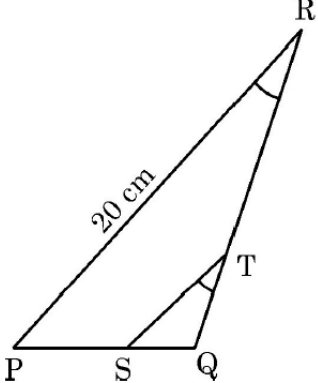
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|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9.  | If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “ <b>Extra Question</b> ”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 10. | No marks to be deducted for the cumulative effect of an error. It should be penalized only once.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 11. | A full scale of 0 to 80 marks as given in Question Paper has to be used. Please do not hesitate to award full marks if the answer deserves it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12. | Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 13. | <p>Ensure that you do not make the following common types of errors committed by the Examiner in the past:-</p> <ul style="list-style-type: none"> <li>● Leaving answer or part thereof unassessed in an answer book.</li> <li>● Giving more marks for an answer than assigned to it.</li> <li>● Wrong totalling of marks awarded to an answer.</li> <li>● Wrong transfer of marks from the inside pages of the answer book to the title page.</li> <li>● Wrong question wise totalling on the title page.</li> <li>● Wrong totalling of marks of the two columns on the title page.</li> <li>● Wrong grand total.</li> <li>● Marks in words and figures not tallying/not same.</li> <li>● Wrong transfer of marks from the answer book to Online Award List.</li> <li>● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)</li> <li>● Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</li> </ul> |
| 14. | While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 15. | Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 16. | The Examiners should acquaint themselves with the guidelines given in the “ <b>Guidelines for spot Evaluation</b> ” before starting the actual evaluation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 17. | Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 18. | The candidates are entitled to obtain Photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

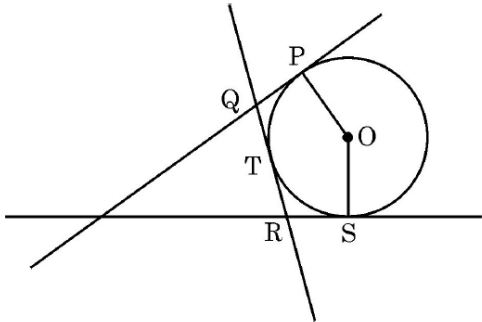
**MARKING SCHEME**  
**MATHEMATICS (Subject Code-041)**  
**(PAPER CODE: 30/8/2)**

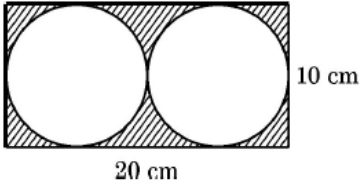
| Q.<br>No. | EXPECTED OUTCOMES/VALUE POINTS                                                                                                                                                                                                                                                                                                                                                                                                   | Marks |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|           | <b>SECTION – A</b><br><br>This section consists of multiple choice questions of 1 mark each.                                                                                                                                                                                                                                                                                                                                     |       |
| 1.        |  <p>5 trees Banyan, Silver Oak, Orange, Amla and Mango were planted in the garden as shown in the figure. If 1 unit = 1 m in the figure, which of the following trees are at a distance of 4 metres ?</p> <p>(A) Amla and Mango                      (B) Mango and Silver Oak<br/>(C) Silver Oak and Orange            (D) Orange and Mango</p> |       |
| Sol.      | (A) Amla and Mango                                                                                                                                                                                                                                                                                                                                                                                                               | 1     |
| 2.        | The sum of ages of Sania and Yogesh is 50 years. If now Sania is twice as old as Yogesh was 5 years ago, then present age of Sania is :<br><br>(A) 40 years                                  (B) 35 years<br>(C) 20 years                                  (D) 30 years                                                                                                                                                          |       |
| Sol.      | (D) 30 years                                                                                                                                                                                                                                                                                                                                                                                                                     | 1     |
| 3.        | If mean of a frequency distribution is 7.5, $\sum f_i x_i = 120 + 3k$ and $\sum f_i = 30$ , then value of k is<br><br>(A) 45                                          (B) 50<br>(C) 35                                          (D) 40                                                                                                                                                                                           |       |
| Sol.      | (C) 35                                                                                                                                                                                                                                                                                                                                                                                                                           | 1     |
| 4.        | If the base radius of a cone and a cylinder are equal and their curved surface areas are also equal, then ratio of the slant height of cone to that of the height of cylinder is :<br><br>(A) 2 : 1                                      (B) 1 : 3<br>(C) 1 : 2                                      (D) 3 : 1                                                                                                                   |       |
| Sol.      | (A) 2 : 1                                                                                                                                                                                                                                                                                                                                                                                                                        | 1     |

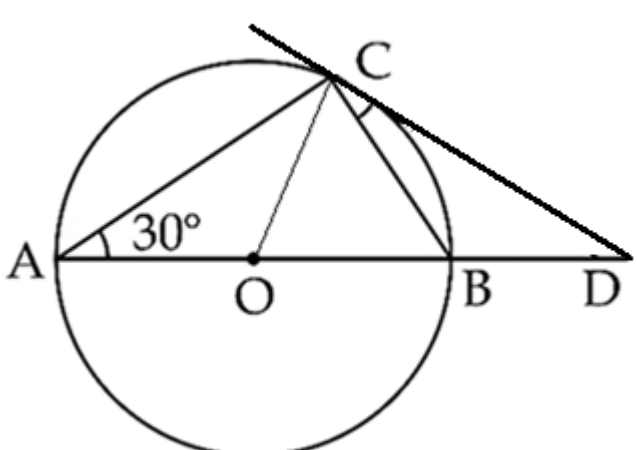
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 5.   | <p>A jar contains some red, black and green marbles. If probability of getting a red marble is <math>\frac{1}{5}</math> and probability of getting a black marble is <math>\frac{1}{4}</math> and jar contains total 11 green marbles, then total number of marbles that were there in the jar is</p> <p>(A) 20 (B) 40<br/>(C) 11 (D) 9</p>                                                                                                                                                                                                              |   |
| Sol. | (A) 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 |
| 6.   | <p>The area of a semi-circular disc whose diameter is 'd', is</p> <p>(A) <math>\pi d^2</math> (B) <math>\frac{\pi d^2}{2}</math><br/>(C) <math>\frac{\pi d^2}{8}</math> (D) <math>\frac{\pi d^2}{4}</math></p>                                                                                                                                                                                                                                                                                                                                           |   |
| Sol. | (C) $\frac{\pi d^2}{8}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 |
| 7.   |  <p>Two circles with centres O and N touch each other at the point P as shown in the figure. O, P and N are collinear. Radius of the circle with centre O is twice that of the circle with centre N. OX is tangent to the circle with centre N and <math>OX = 18</math> cm. The radius of the circle with centre N is :</p> <p>(A) <math>\frac{18}{\sqrt{2}}</math> cm (B) 9 cm<br/>(C) <math>\frac{9}{\sqrt{2}}</math> cm (D) <math>\frac{18}{\sqrt{10}}</math> cm</p> |   |
| Sol. | (C) $\frac{9}{\sqrt{2}}$ cm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1 |
| 8.   |  <p>In the figure, three sectors of a circle of radius 7 cm making central angles <math>60^\circ</math>, <math>80^\circ</math> and <math>40^\circ</math> are shown. The area of the shaded region is :</p> <p>(A) <math>77 \text{ cm}^2</math> (B) <math>22 \text{ cm}^2</math><br/>(C) <math>154 \text{ cm}^2</math> (D) <math>0 \text{ cm}^2</math></p>                                                                                                             |   |
| Sol. | (A) $77 \text{ cm}^2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1 |

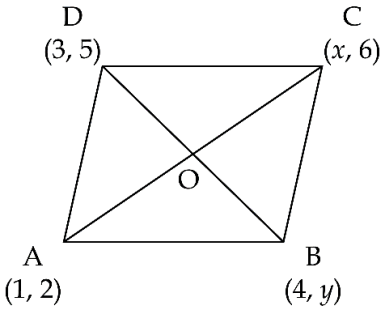
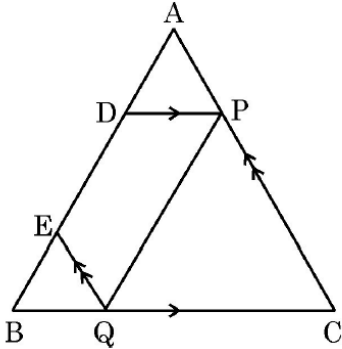
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 9.   | <p>If the roots of a quadratic equation <math>ax^2 + bx + c = 0</math> are equal but opposite in sign, then :</p> <p>(A) <math>a = 0</math> (B) <math>b = 0</math><br/>(C) <math>b \neq 0</math> (D) <math>a &lt; b</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |   |
| Sol. | (B) $b = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1 |
| 10.  |  <p>Here is the geometrical representation of a polynomial. How many zeroes does it have ?</p> <p>(A) 3 (B) 1<br/>(C) 2 (D) 4</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| Sol. | (A) 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 |
| 11.  | <p>Three lines <math>k_1</math>, <math>k_2</math>, <math>k_3</math> represent three different equations as shown in the figure below. Solution of the equations represented by lines <math>k_1</math> and <math>k_3</math> is <math>x = 3</math>, <math>y = 0</math>, while solution of equations represented by lines <math>k_2</math> and <math>k_3</math> is <math>x = 4</math>, <math>y = 1</math>.</p> <p>Which of the following is the equation of line <math>k_3</math> ?</p>  <p>(A) <math>x - y = 3</math> (B) <math>x - y = -3</math><br/>(C) <math>x + y = 3</math> (D) <math>x + y = 1</math></p> |   |
| Sol. | (A) $x - y = 3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 |
| 12.  | <p>Which term of A.P. 21, 18, 15, ..... is zero ?</p> <p>(A) 9<sup>th</sup> (B) 5<sup>th</sup><br/>(C) 8<sup>th</sup> (D) 10<sup>th</sup></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |
| Sol. | (C) 8 <sup>th</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1 |

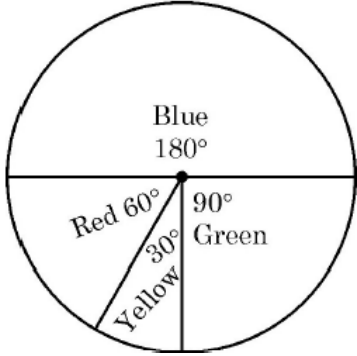
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 13.  |  <p>In the figure, <math>AD = DB</math>, <math>\angle B</math> is a right angle and <math>\angle BCD = \theta</math>, <math>AC = b</math> and <math>AB = a</math>. Then, <math>\tan \theta</math> is equal to</p> <p>(A) <math>\frac{2a}{\sqrt{b^2 - a^2}}</math>                      (B) <math>\frac{a}{2\sqrt{b^2 - a^2}}</math></p> <p>(C) <math>\frac{a}{2\sqrt{b^2 + a^2}}</math>                      (D) <math>\frac{a}{2(b^2 - a^2)}</math></p> |   |
| Sol. | (B) $\frac{a}{2\sqrt{b^2 - a^2}}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1 |
| 14.  | <p>For which value(s) of 'p' will the lines represented by the following pair of linear equations be parallel ?</p> <p><math>3x - y - 5 = 0</math> and <math>6x - 2y - p = 0</math></p> <p>(A) <math>\frac{1}{2}</math>                                      (B) 10</p> <p>(C) <math>\frac{5}{2}</math>                                      (D) All real values except 10</p>                                                                                                                                                            |   |
| Sol. | (D) All real values except 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1 |
| 15.  | <p>PQR is a triangle in which <math>PR = 20</math> cm as shown in the figure. Line ST is drawn such that <math>\angle PRQ = \angle STQ</math>. If ST divides side QR in ratio 2 : 3, then the length of ST is :</p>  <p>(A) <math>\frac{10}{3}</math> cm                              (B) 8 cm</p> <p>(C) 12 cm                                  (D) <math>\frac{40}{3}</math> cm</p>                                                                  |   |
| Sol. | (B) 8 cm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                           |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 16.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Suppose box A has 4 green and 5 black balls. Box B has 7 green and 8 red balls and box C has 8 green and 10 yellow balls. Which box has greatest probability of getting a green ball ?<br>(A) Box A<br>(C) Box C<br>(B) Box B<br>(D) Can't say                                                                                            |   |
| Sol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (B) Box B                                                                                                                                                                                                                                                                                                                                 | 1 |
| 17.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | What happens to the angle of elevation of the top of a tower, if distance between tower and observer is doubled ?<br>(A) Increases<br>(C) Becomes $0^\circ$<br>(B) Decreases<br>(D) Remains the same                                                                                                                                      |   |
| Sol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (B) Decreases                                                                                                                                                                                                                                                                                                                             | 1 |
| 18.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  <p>In the given figure, there is a circle with centre 'O' having three tangents at points P, T and S. If QR = 12 cm and radius of a circle is 7 cm, then perimeter of polygon PQRSO is :</p> <p>(A) 26 cm<br/>(C) 38 cm<br/>(B) 31 cm<br/>(D) 33 cm</p> |   |
| Sol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (C) 38 cm                                                                                                                                                                                                                                                                                                                                 | 1 |
| <p align="center"><b>(Assertion and Reason based Questions)</b></p> <p><b>Direction :</b> Question Numbers 19 and 20 are Assertion (A) and Reason (R) based questions. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the options (A), (B), (C) and (D) as given below :</p> <p>(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).</p> <p>(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).</p> <p>(C) Assertion (A) is true, but Reason (R) is false.</p> <p>(D) Assertion (A) is false, but Reason (R) is true.</p> |                                                                                                                                                                                                                                                                                                                                           |   |
| 19.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Assertion (A) :</b> The number <math>12^n</math> ends with digit 0 where 'n' is a natural number.</p> <p><b>Reason (R) :</b> Any number ends with digit 0 if its prime factor is of the form <math>2^m \times 5^n</math>, where 'm' and 'n' are natural numbers.</p>                                                                |   |
| Sol.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (D) Assertion (A) is false, but Reason (R) is true.                                                                                                                                                                                                                                                                                       | 1 |

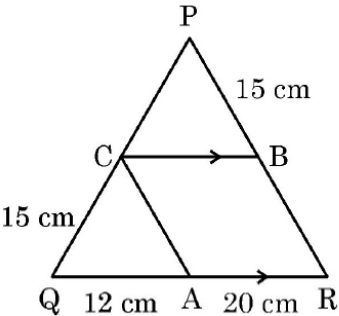
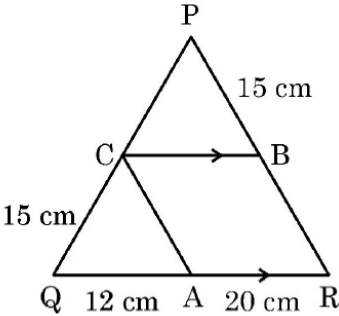
|               |                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>20.</b>    | <p><b>Assertion (A) :</b> If values of Mode and Mean of a data are 60 and 66 respectively, then the value of Median is 64.</p> <p><b>Reason (R) :</b> For any data, <math>2 \text{ Mean} = \text{Mode} + 3 \text{ Median}</math>.</p>                                                                                                 |                                                                                                                                 |
| <b>Sol.</b>   | (C) Assertion (A) is true, but Reason (R) is false.                                                                                                                                                                                                                                                                                   | <b>1</b>                                                                                                                        |
|               | <p style="text-align: center;"><b>SECTION – B</b></p> <p>This section consists of Very Short Answer (VSA) type questions of 2 marks each.</p>                                                                                                                                                                                         |                                                                                                                                 |
| <b>21 (a)</b> | <p>In the figure, find the area of the shaded region.</p>  <p style="text-align: center;">(Take <math>\pi = 3.14</math>)</p>                                                                                                                         |                                                                                                                                 |
| <b>Sol.</b>   | <p>Radius of the circle = 5 cm</p> <p>Area of shaded region = Area of rectangle – <math>2 \times</math> area of circle</p> <p style="text-align: center;"><math>= 20 \times 10 - 2 \times 3.14 \times (5)^2 = 43 \text{ cm}^2</math></p>                                                                                              | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p>                                                 |
|               | <b>OR</b>                                                                                                                                                                                                                                                                                                                             |                                                                                                                                 |
| <b>21 (b)</b> | Find the radius of the circle whose one sector has area of 66 sq. cm. and the length of its arc is 22 cm.                                                                                                                                                                                                                             |                                                                                                                                 |
| <b>Sol.</b>   | <p>Let the radius of the circle be '<math>r</math>' cm</p> <p>Area of sector = <math>\frac{\theta}{360} \times \pi r^2 = 66</math> --- (i)</p> <p>Length of arc = <math>\frac{\theta}{360} \times 2\pi r = 22</math> --- (ii)</p> <p>Dividing (i) by (ii), we get <math>r = 6</math></p> <p>So, the radius of the circle is 6 cm.</p> | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p>                                                 |
| <b>22 (a)</b> | Find the greatest number which divides 37, 66, 89, leaving remainder 2, 3, 5 respectively.                                                                                                                                                                                                                                            |                                                                                                                                 |
| <b>Sol.</b>   | <p><math>37 - 2 = 35 = 5 \times 7</math></p> <p><math>66 - 3 = 63 = 3^2 \times 7</math></p> <p><math>89 - 5 = 84 = 2^2 \times 3 \times 7</math></p> <p>HCF (35, 63, 84) = 7</p> <p><math>\therefore</math> required number is 7.</p>                                                                                                  | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> |
|               | <b>OR</b>                                                                                                                                                                                                                                                                                                                             |                                                                                                                                 |
| <b>22 (b)</b> | Sum and difference of two numbers is 256 and 224 respectively. Find their HCF and LCM.                                                                                                                                                                                                                                                |                                                                                                                                 |
| <b>Sol.</b>   | Let two numbers be ' $x$ ' and ' $y$ ' where $x > y$                                                                                                                                                                                                                                                                                  |                                                                                                                                 |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                          |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
|      | <p>According to Question</p> $x + y = 256 \quad \text{--- (i)}$ $x - y = 224 \quad \text{--- (ii)}$ <p>Solving (i) and (ii), we get <math>x = 240</math> and <math>y = 16</math></p> <p><math>\text{HCF}(240, 16) = 16</math></p> <p>and <math>\text{LCM}(240, 16) = 240</math></p>                                                                                                                                                                                                                                                    | <p>}</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> |
| 23.  | If ' $\alpha$ ' and ' $\beta$ ' are the roots of quadratic equation $x^2 + (k^2 - 1)x - 20 = 0$ such that $\alpha^2 - \beta^2 - \alpha\beta = 29$ and $\alpha - \beta = 9$ , then find the value of $k$ .                                                                                                                                                                                                                                                                                                                              |                                                                                                                                          |
| Sol. | <p>Here, <math>(\alpha + \beta) = -k^2 + 1</math> and <math>\alpha\beta = -20</math></p> $(\alpha - \beta)(\alpha + \beta) - \alpha\beta = 29$ $\Rightarrow 9 \times (-k^2 + 1) + 20 = 29$ $\Rightarrow k^2 = 0 \Rightarrow k = 0$                                                                                                                                                                                                                                                                                                     | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>          |
| 24.  | AB is diameter of a circle and AC is its chord such that $\angle BAC = 30^\circ$ . If the tangent at C intersects AB extended at D, then prove that $BC = BD$ .                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                          |
| Sol. | <div style="text-align: center;">  </div> <p>Join OC.</p> <p><math>\angle ACB = 90^\circ \therefore \angle ABC = 60^\circ</math></p> <p>In <math>\Delta BOC</math>, <math>OB = OC \Rightarrow \angle OCB = \angle OBC = 60^\circ</math></p> <p><math>\angle BCD = 90^\circ - 60^\circ = 30^\circ</math> and <math>\angle BDC = 60^\circ - 30^\circ = 30^\circ</math></p> <p><math>\therefore \angle BCD = \angle BDC \Rightarrow BC = BD</math></p> | <p>Correct figure.</p> <p><math>\frac{1}{2}</math></p> <p>}</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>          |

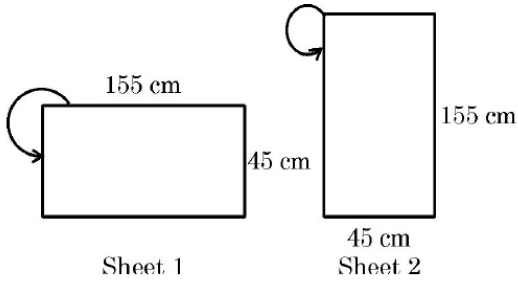
|                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 25.                                                                                                                                     | If points A(1, 2), B(4, y), C(x, 6) and D(3, 5) are the vertices of a parallelogram ABCD, then find values of x and y.                                                                                                                                                                                                                                                                     |                                                                                                                                          |
| Sol.                                                                                                                                    |  <p>Co-ordinates of midpoint of AC = Co-ordinates of midpoint of BD</p> $\left(\frac{1+x}{2}, \frac{2+6}{2}\right) = \left(\frac{3+4}{2}, \frac{5+y}{2}\right)$ $\Rightarrow \frac{1+x}{2} = \frac{7}{2} \Rightarrow x = 6 \text{ and } \frac{5+y}{2} = \frac{8}{2} \Rightarrow y = 3$                    | <p>1</p> <p><math>\frac{1}{2} + \frac{1}{2}</math></p>                                                                                   |
| <p style="text-align: center;"><b>SECTION – C</b></p> <p>This section consists of Short Answer (SA) type questions of 3 marks each.</p> |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                          |
| 26                                                                                                                                      | <p>In the given figure, ABC is a triangle in which D, E are two points on the side AB such that AD = BE. If DP    BC and EQ    AC, then prove that PQ    AB.</p>                                                                                                                                         |                                                                                                                                          |
| Sol.                                                                                                                                    | <p>Given DP    BC,</p> $\frac{AD}{DB} = \frac{AP}{PC} \quad \text{--- (i)}$ <p>Similarly, <math>\frac{BE}{EA} = \frac{BQ}{QC} \quad \text{--- (ii)}</math></p> <p>Since given AD = BE</p> <p>add DE to both sides</p> $AD + DE = BE + DE$ $\therefore AE = BD \quad \text{--- (iii)}$ <p>From (i), (ii) and (iii), we get</p> $\frac{AP}{PC} = \frac{BQ}{QC}$ $\therefore PQ \parallel AB$ | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                   |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 27 (a)    | <p>In a Carton, there were blue, red, green and yellow balls. There were 240 balls. The number of balls of each colour is represented in the following pie chart. If Shreya picked a ball at random, then what is the probability that she picked a yellow ball ? If 20 more yellow balls were added to the carton, what is the probability that now she picked a ball which is yellow or green ?</p>                                                                                                             |                                                                                   |
| Sol.      | <p>Total balls = 240</p> <p><math>P(\text{yellow ball}) = \frac{30}{360}</math> or <math>\frac{1}{12}</math></p> <p>Number of yellow balls = <math>\frac{30}{360} \times 240 = 20</math></p> <p>Number of green balls = <math>\frac{90}{360} \times 240 = 60</math></p> <p>Number of yellow balls after adding 20 more yellow balls = 40</p> <p>Total number of balls after adding 20 more yellow balls = 260</p> <p><math>P(\text{yellow or green ball}) = \frac{40+60}{260} = \frac{100}{260}</math> or <math>\frac{5}{13}</math></p>                                                            | <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> |
| <b>OR</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                   |
| 27 (b)    | <p>Offices in Delhi are open for 5 days a week Monday to Friday. Two employees of an office remain absent for one day in the same particular week. Find the probability that they remain absent on the same day. Also, find the probability that it was a Friday.</p>                                                                                                                                                                                                                                                                                                                              |                                                                                   |
| Sol.      | <p>Possible outcomes are:</p> <p>(Mon, Mon), (Mon, Tue), (Mon, Wed), (Mon, Thu), (Mon, Fri)</p> <p>(Tue, Mon), (Tue, Tue), (Tue, Wed), (Tue, Thu), (Tue, Fri)</p> <p>(Wed, Mon), (Wed, Tue), (Wed, Wed), (Wed, Thu), (Wed, Fri)</p> <p>(Thu, Mon), (Thu, Tue), (Thu, Wed), (Thu, Thu), (Thu, Fri)</p> <p>(Fri, Mon), (Fri, Tue), (Fri, Wed), (Fri, Thu), (Fri, Fri)</p> <p><math>\therefore</math> Total number of outcomes = 25</p> <p><math>P(\text{Absent on the same day}) = \frac{5}{25}</math> or <math>\frac{1}{5}</math></p> <p><math>P(\text{Absent on Friday}) = \frac{1}{25}</math></p> | <p>1</p> <p>1</p> <p>1</p>                                                        |

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>28.</b>    | Solve for $x$ : $\frac{4}{x} - 3 = \frac{5}{2x+3}$ , $x \neq 0, \frac{-3}{2}$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                        |
| <b>Sol.</b>   | $\frac{4}{x} - \frac{5}{2x+3} = 3$ $\Rightarrow 6x^2 + 6x - 12 = 0 \text{ or } x^2 + x - 2 = 0$ $\Rightarrow (x+2)(x-1) = 0$ $\therefore x = -2, 1$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>1</b><br><b>1</b><br><b>1</b>                       |
| <b>29 (a)</b> | Show that $\frac{3+\sqrt{3}}{5}$ is an irrational number, given $\sqrt{3}$ is an irrational number. Also, find an irrational number whose sum with given number is an irrational number.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |
| <b>Sol.</b>   | <p>Let us assume that <math>\frac{3+\sqrt{3}}{5}</math> be a rational number.</p> $\therefore \frac{3+\sqrt{3}}{5} = \frac{p}{q}, \text{ where } p \text{ and } q \text{ are integers and } q \neq 0$ $\Rightarrow \sqrt{3} = \frac{5p-3q}{q}$ <p>RHS is a rational number. So, LHS is also a rational number i.e. <math>\sqrt{3}</math> is a rational number but this contradicts the fact that <math>\sqrt{3}</math> is an irrational number.</p> <p><math>\therefore</math> our assumption is wrong.</p> <p>Hence, <math>\frac{3+\sqrt{3}}{5}</math> be an irrational number.</p> <p>Any number except <math>\frac{-\sqrt{3}}{5}</math></p> | $\frac{1}{2}$<br><b>1</b><br><b>1</b><br>$\frac{1}{2}$ |
|               | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                        |
| <b>29 (b)</b> | Sandhya has two pieces of cloth – one 144 cm wide and the other 96 cm wide. She wants to cut both the cloth pieces into equal sized strips such that one is as wide as possible with none left over. What is the width she can cut ? How many pieces will she get in all ?                                                                                                                                                                                                                                                                                                                                                                     |                                                        |
| <b>Sol.</b>   | $144 = 2^4 \times 3^2$ $96 = 2^5 \times 3$ $\therefore \text{HCF} = 2^4 \times 3 = 48$ $\therefore \text{required width of cloth piece is } 48 \text{ cm}$ $\text{Number of pieces} = \frac{144}{48} + \frac{96}{48} = 5$                                                                                                                                                                                                                                                                                                                                                                                                                      | $\frac{1}{2}$<br>$\frac{1}{2}$<br><b>1</b><br><b>1</b> |
| <b>30.</b>    | If point $P(x, y)$ is equidistant from points $Q(a+b, b-a)$ and $R(a-b, a+b)$ , then prove that $bx = ay$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                        |
| <b>Sol.</b>   | <p>Given <math>PQ = PR</math></p> $\therefore PQ^2 = PR^2$ $\Rightarrow [x - (a+b)]^2 + [y - (b-a)]^2 = [x - (a-b)]^2 + [y - (a+b)]^2$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>1½</b>                                              |

|                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|                                                                           | $\Rightarrow 4bx = 4ay \Rightarrow bx = ay$                                                                                                                                                                                                                                                                                                                                                                                                                       | 1½     |
| 31.                                                                       | Prove that : $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$                                                                                                                                                                                                                                                                                                                                                                     |        |
| Sol.                                                                      | $\text{LHS} = \left( \frac{1}{\sin A} - \sin A \right) \left( \frac{1}{\cos A} - \cos A \right)$ $= \left( \frac{1 - \sin^2 A}{\sin A} \right) \left( \frac{1 - \cos^2 A}{\cos A} \right) = \sin A \cos A$                                                                                                                                                                                                                                                        | 1½     |
|                                                                           | $\text{RHS} = \frac{1}{\frac{\sin A \cdot \cos A}{\cos A + \sin A}}$ $= \frac{\sin A \cos A}{\sin^2 A + \cos^2 A} = \sin A \cos A$                                                                                                                                                                                                                                                                                                                                | 1½     |
|                                                                           | $\therefore \text{LHS} = \text{RHS}$                                                                                                                                                                                                                                                                                                                                                                                                                              |        |
| <b>SECTION – D</b>                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |
| This section consists of Long Answer (LA) type questions of 5 marks each. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |
| 32.                                                                       | <p>Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides at distinct points, then the other two sides are divided in the same ratio.</p>  <p>If <math>CB \parallel QR</math>, <math>CA \parallel PR</math>, <math>AQ = 12</math> cm, <math>AR = 20</math> cm and <math>PB = CQ = 15</math> cm, calculate the lengths PC and BR.</p> |        |
| Sol.                                                                      | Correct figure, given, to prove, construction                                                                                                                                                                                                                                                                                                                                                                                                                     | 2      |
|                                                                           | Correct proof                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2      |
|                                                                           |  <p> <math>CA \parallel PR \Rightarrow \frac{12}{20} = \frac{15}{PC} \Rightarrow PC = 25</math> cm<br/> <math>CB \parallel QR \Rightarrow \frac{25}{15} = \frac{15}{BR} \Rightarrow BR = 9</math> cm </p>                                                                                                                                                                      | ½<br>½ |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 33.    | <p>Two boys of same height 1.2 m are flying kite at the same place. One of them takes 25 m long thread which makes an angle of elevation <math>45^\circ</math> with horizontal line whereas the other boy takes 35 m long thread which makes an angle of elevation <math>60^\circ</math> with the same horizontal line. If both kites are in the same vertical line, find how high the kite of the second boy is to the first boy.</p> <p>(Take <math>\sqrt{3} = 1.73</math>, <math>\sqrt{2} = 1.41</math>)</p>                                      |                                                                                      |
| Sol.   | <div> </div> <p style="text-align: right;">Correct figure</p> <p>In <math>\triangle BDE</math>, <math>\frac{DE}{25} = \sin 45^\circ = \frac{1}{\sqrt{2}}</math><br/> <math>\Rightarrow DE = \frac{25 \times 1.41}{2} = 17.625 \text{ m}</math></p> <p>In <math>\triangle BDE</math>, <math>\frac{DF}{35} = \sin 60^\circ = \frac{\sqrt{3}}{2}</math><br/> <math>\Rightarrow DF = \frac{35 \times 1.73}{2} = 30.275 \text{ m}</math></p> <p><math>EF = 30.275 - 17.625 = 12.65 \text{ m}</math></p> | <p>1<br/><math>\frac{1}{2}</math><br/>1<br/><math>\frac{1}{2}</math><br/>1<br/>1</p> |
| 34 (a) | <p>Saransh is building a green house in his farm as shown. The base of the green house is circular having a diameter of 12 m and it has a hemispherical dome on the top of a cylindrical base of height 2 m. How much will it cost him to cover the green house with transparent plastic both the cylindrical and hemispherical part if the plastic sheet costs ₹ 70 per sq. metre ? Also, find the volume of air inside.</p> <div> </div>                                                          |                                                                                      |
| Sol.   | <p>Radius = 6 m</p> <p>Area of plastic sheet required = CSA of cylinder + CSA of hemisphere</p> $= 2 \times \frac{22}{7} \times 6 \times 2 + 2 \times \frac{22}{7} \times (6)^2$ $= \frac{2112}{7} \text{ m}^2$                                                                                                                                                                                                                                                                                                                                      | <p><math>\frac{1}{2}</math><br/><br/>1<br/><math>\frac{1}{2}</math></p>              |

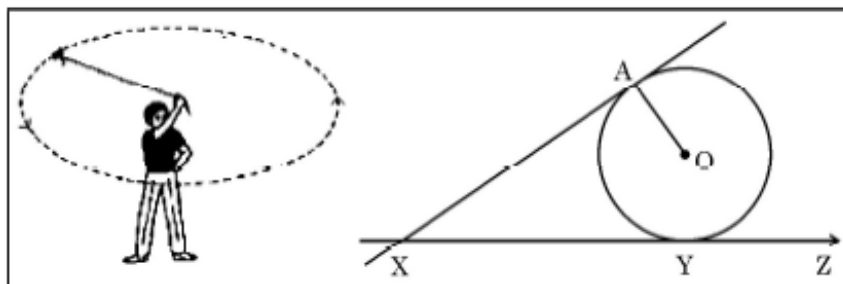
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
|             | Cost of plastic sheet @ ₹ 70/m <sup>2</sup> = $\frac{2112}{7} \times 70 = ₹ 21120$                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                               |
|             | Volume of air = $\frac{22}{7} \times (6)^2 \times 2 + \frac{2}{3} \times \frac{22}{7} \times (6)^3$                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                               |
|             | = $\frac{4752}{7} \text{ m}^3$ or 678.85 m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                               |
|             | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |
| 34 (b)      |  <p>Two equal rectangular sheets of dimensions 155 cm × 45 cm as shown in the figure are folded to make hollow right circular cylinders in such a way that there is exactly 1 cm overlap when sticking the ends of the sheet. Sheet 1 is folded to form a cylinder of height 45 cm while sheet 2 is folded to get a cylinder of height 155 cm. Find the difference in the radii of the two cylinders and hence find the ratio of their volumes.</p> |                                 |
| <b>Sol.</b> | Circumference of sheet 1 = 155 – 1 = 154 cm<br>$2 \times \frac{22}{7} \times r_1 = 154 \Rightarrow r_1 = \frac{49}{2} = 24.5 \text{ cm}$<br>Circumference of sheet 2 = 45 – 1 = 44 cm<br>$2 \times \frac{22}{7} \times r_2 = 44 \Rightarrow r_2 = 7 \text{ cm}$<br>Difference in radii = 24.5 – 7 = 17.5 cm<br>Ratio of volumes = $\frac{\pi \times (7)^2 \times 155}{\pi \times (24.5)^2 \times 45}$<br>= $\frac{124}{441}$ or 124 : 441 or 441 : 241                                                                               | ½<br>1<br>½<br>1<br>½<br>1<br>½ |
| 35 (a)      | Find the sum of first 22 terms of an A.P. in which d = 7 and 22 <sup>nd</sup> term is 149.                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |
| <b>Sol.</b> | $a_{22} = 149 \Rightarrow a + 21 \times 7 = 149$<br>$\Rightarrow a = 2$<br>$S_{22} = \frac{22}{2} \times (2 + 149)$<br>= 1661                                                                                                                                                                                                                                                                                                                                                                                                        | 1½<br>1<br>1½<br>1              |
|             | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |

| 35 (b)                                    | Split 207 into three parts such that these three parts are in A.P. and the product of the two smaller parts is 4623.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------|-------------|---|-------------|---|-------------|----|-------------|---|-------------|---|-------------|---|--|
| Sol.                                      | Let three parts be (a – d), a and (a + d).<br>According to the statement<br>(a – d) + a + (a + d) = 207<br>⇒ a = 69<br>Also a × (a – d) = 4623<br>⇒ 69 × (69 – d) = 4623<br>⇒ d = 2<br>Therefore, required three parts are 67, 69 and 71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ½<br><br>1<br>½<br>½<br>1<br>½<br>1       |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
|                                           | <div>SECTION - E</div> <div>This section consists of Case Study based questions of 4 marks each.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 36.                                       | <div>Sulphur dioxide (SO<sub>2</sub>) is a major air pollutant, and has significant impact upon human health. It influences the plants communities as well as animal life.</div> <div>To find out concentration of SO<sub>2</sub> in the air (in parts per million i.e. ppm), the data was collected from 30 localities in Delhi and is presented below :</div> <table><tr><th>Concentration of SO<sub>2</sub> (in ppm)</th><th>Frequency</th></tr><tr><td>0.00 – 0.04</td><td>4</td></tr><tr><td>0.04 – 0.08</td><td>8</td></tr><tr><td>0.08 – 0.12</td><td>10</td></tr><tr><td>0.12 – 0.16</td><td>2</td></tr><tr><td>0.16 – 0.20</td><td>4</td></tr><tr><td>0.20 – 0.24</td><td>2</td></tr></table> <div>Based on the above, answer the following questions :</div> <div>(i) What is the lower limit of median class ?</div> <div>(ii) What is the modal class of the above data ?</div> <div>(iii) (a) What is the mean concentration of SO<sub>2</sub> in air ?</div> <div>OR</div> <div>(b) Find the median of the above data.</div> | Concentration of SO <sub>2</sub> (in ppm) | Frequency | 0.00 – 0.04 | 4 | 0.04 – 0.08 | 8 | 0.08 – 0.12 | 10 | 0.12 – 0.16 | 2 | 0.16 – 0.20 | 4 | 0.20 – 0.24 | 2 |  |
| Concentration of SO <sub>2</sub> (in ppm) | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.00 – 0.04                               | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.04 – 0.08                               | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.08 – 0.12                               | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.12 – 0.16                               | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.16 – 0.20                               | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |
| 0.20 – 0.24                               | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                           |           |             |   |             |   |             |    |             |   |             |   |             |   |  |

| Sol.                                      | (i)                                                                                                                                                                                                                                                                                                                                      | <table><tr><th>Concentration of SO<sub>2</sub> (in ppm)</th><th>Frequency</th><th>cf</th></tr><tr><td>0.00 – 0.04</td><td>4</td><td>4</td></tr><tr><td>0.04 – 0.08</td><td>8</td><td>12</td></tr><tr><td>0.08 – 0.12</td><td>10</td><td>22</td></tr><tr><td>0.12 – 0.16</td><td>2</td><td>24</td></tr><tr><td>0.16 – 0.20</td><td>4</td><td>28</td></tr><tr><td>0.20 – 0.24</td><td>2</td><td>30</td></tr></table>                                                                                                                                                                                                                                                                                                                                | Concentration of SO <sub>2</sub> (in ppm)  | Frequency                     | cf             | 0.00 – 0.04                                | 4                             | 4           | 0.04 – 0.08 | 8    | 12  | 0.08 – 0.12 | 10          | 22 | 0.12 – 0.16 | 2   | 24  | 0.16 – 0.20 | 4  | 28       | 0.20 – 0.24 | 2 | 30          |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------|----------------|--------------------------------------------|-------------------------------|-------------|-------------|------|-----|-------------|-------------|----|-------------|-----|-----|-------------|----|----------|-------------|---|-------------|---|------|---|---|-------------|---|------|---|---|-------------|---|------|---|---|-------|----|--|--|---|--|
|                                           | Concentration of SO <sub>2</sub> (in ppm)                                                                                                                                                                                                                                                                                                | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | cf                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.00 – 0.04                                                                                                                                                                                                                                                                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.04 – 0.08                                                                                                                                                                                                                                                                                                                              | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 12                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.08 – 0.12                                                                                                                                                                                                                                                                                                                              | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 22                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.12 – 0.16                                                                                                                                                                                                                                                                                                                              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.16 – 0.20                                                                                                                                                                                                                                                                                                                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 28                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | 0.20 – 0.24                                                                                                                                                                                                                                                                                                                              | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30                                         |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           |                                                                                                                                                                                                                                                                                                                                          | Median class is 0.08 – 0.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           |                                                                                                                                                                                                                                                                                                                                          | ∴ lower limit of median class is 0.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                            | 1                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | (ii) Modal class is 0.08 – 0.12                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | (iii) (a)                                                                                                                                                                                                                                                                                                                                | <table><tr><th>Concentration of SO<sub>2</sub> (in ppm)</th><th>f<sub>i</sub></th><th>x<sub>i</sub></th><th>u<sub>i</sub> = <math>\frac{x_i - 0.10}{0.04}</math></th><th>f<sub>i</sub> u<sub>i</sub></th></tr><tr><td>0.00 – 0.04</td><td>4</td><td>0.02</td><td>– 2</td><td>– 8</td></tr><tr><td>0.04 – 0.08</td><td>8</td><td>0.06</td><td>– 1</td><td>– 8</td></tr><tr><td>0.08 – 0.12</td><td>10</td><td>0.10 = a</td><td>0</td><td>0</td></tr><tr><td>0.12 – 0.16</td><td>2</td><td>0.14</td><td>1</td><td>2</td></tr><tr><td>0.16 – 0.20</td><td>4</td><td>0.18</td><td>2</td><td>8</td></tr><tr><td>0.20 – 0.24</td><td>2</td><td>0.22</td><td>3</td><td>6</td></tr><tr><td>Total</td><td>30</td><td></td><td></td><td>0</td></tr></table> | Concentration of SO <sub>2</sub> (in ppm)  | f <sub>i</sub>                | x <sub>i</sub> | u <sub>i</sub> = $\frac{x_i - 0.10}{0.04}$ | f <sub>i</sub> u <sub>i</sub> | 0.00 – 0.04 | 4           | 0.02 | – 2 | – 8         | 0.04 – 0.08 | 8  | 0.06        | – 1 | – 8 | 0.08 – 0.12 | 10 | 0.10 = a | 0           | 0 | 0.12 – 0.16 | 2 | 0.14 | 1 | 2 | 0.16 – 0.20 | 4 | 0.18 | 2 | 8 | 0.20 – 0.24 | 2 | 0.22 | 3 | 6 | Total | 30 |  |  | 0 |  |
| Concentration of SO <sub>2</sub> (in ppm) | f <sub>i</sub>                                                                                                                                                                                                                                                                                                                           | x <sub>i</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | u <sub>i</sub> = $\frac{x_i - 0.10}{0.04}$ | f <sub>i</sub> u <sub>i</sub> |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.00 – 0.04                               | 4                                                                                                                                                                                                                                                                                                                                        | 0.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | – 2                                        | – 8                           |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.04 – 0.08                               | 8                                                                                                                                                                                                                                                                                                                                        | 0.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | – 1                                        | – 8                           |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.08 – 0.12                               | 10                                                                                                                                                                                                                                                                                                                                       | 0.10 = a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0                                          | 0                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.12 – 0.16                               | 2                                                                                                                                                                                                                                                                                                                                        | 0.14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                          | 2                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.16 – 0.20                               | 4                                                                                                                                                                                                                                                                                                                                        | 0.18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2                                          | 8                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.20 – 0.24                               | 2                                                                                                                                                                                                                                                                                                                                        | 0.22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3                                          | 6                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| Total                                     | 30                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            | 0                             |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           |                                                                                                                                                                                                                                                                                                                                          | Correct table                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | Mean = $0.10 + \frac{0}{30} \times 0.04 = 0.10$                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | Therefore, mean concentration of SO <sub>2</sub> in air is 0.10 ppm                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | OR                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | (iii) (b)                                                                                                                                                                                                                                                                                                                                | <table><tr><th>Concentration of SO<sub>2</sub> (in ppm)</th><th>Frequency</th><th>cf</th></tr><tr><td>0.00 – 0.04</td><td>4</td><td>4</td></tr><tr><td>0.04 – 0.08</td><td>8</td><td>12</td></tr><tr><td>0.08 – 0.12</td><td>10</td><td>22</td></tr><tr><td>0.12 – 0.16</td><td>2</td><td>24</td></tr><tr><td>0.16 – 0.20</td><td>4</td><td>28</td></tr><tr><td>0.20 – 0.24</td><td>2</td><td>30</td></tr></table>                                                                                                                                                                                                                                                                                                                                | Concentration of SO <sub>2</sub> (in ppm)  | Frequency                     | cf             | 0.00 – 0.04                                | 4                             | 4           | 0.04 – 0.08 | 8    | 12  | 0.08 – 0.12 | 10          | 22 | 0.12 – 0.16 | 2   | 24  | 0.16 – 0.20 | 4  | 28       | 0.20 – 0.24 | 2 | 30          |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| Concentration of SO <sub>2</sub> (in ppm) | Frequency                                                                                                                                                                                                                                                                                                                                | cf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.00 – 0.04                               | 4                                                                                                                                                                                                                                                                                                                                        | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.04 – 0.08                               | 8                                                                                                                                                                                                                                                                                                                                        | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.08 – 0.12                               | 10                                                                                                                                                                                                                                                                                                                                       | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.12 – 0.16                               | 2                                                                                                                                                                                                                                                                                                                                        | 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.16 – 0.20                               | 4                                                                                                                                                                                                                                                                                                                                        | 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 0.20 – 0.24                               | 2                                                                                                                                                                                                                                                                                                                                        | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           |                                                                                                                                                                                                                                                                                                                                          | Correct table                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ½                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | Median class is 0.08 – 0.12                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ½                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | Median = $0.08 + \frac{15-12}{10} \times 0.04$                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ½                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | = 0.092                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ½                                          |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
|                                           | Therefore, median concentration of SO <sub>2</sub> in air is 0.092 ppm                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |
| 37.                                       | Ramesh was fond of spinning/revolving a ball tied with a rope of length 2 m. While playing, the ball slipped from the rope and hit his brother Suresh lightly. Suresh threw the ball back to Ramesh that made an angle of 60° with AX along the path XYZ which is a tangent to the imaginary circle as shown in fig. 1. i.e. ∠AXZ = 60°. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                            |                               |                |                                            |                               |             |             |      |     |             |             |    |             |     |     |             |    |          |             |   |             |   |      |   |   |             |   |      |   |   |             |   |      |   |   |       |    |  |  |   |  |

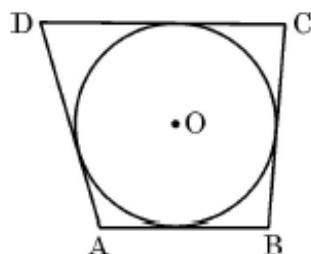
Based on the above, answer the following questions :

- (i) If the length of rope used by Ramesh is 2 m, what is the diameter of the circle ?
- (ii) Find the length XY shown in figure.



(Fig. 1)

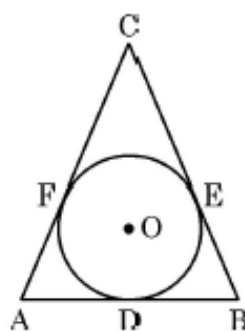
- (iii) (a) Ramesh made the same circle on the ground using the rope he had and placed 4 sticks around it as shown in the figure with  $AB = 3$  m,  $AD = BC = 5$  m. Find length of CD. Justify your answer.



(Fig. 2)

OR

- (b) Suresh made another circle with radius 4 m and placed 3 sticks as shown in the figure. If  $AD = 6$  m,  $BD = 8$  m and area of triangle ABC is 84 sq. m., find the lengths of AC and BC.



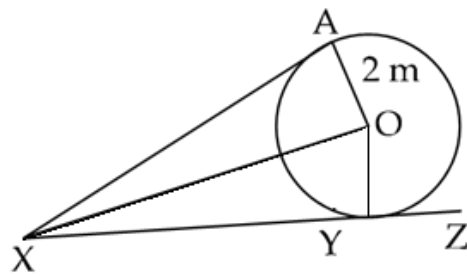
(Fig. 3)

**Sol.**

- (i) 4 m

**1**

(ii)



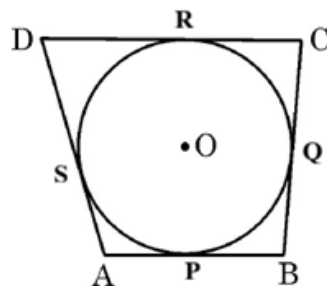
Join OY and OX.

$\Delta OAX \cong \Delta OYX \therefore \angle OXY = 30^\circ$

In  $\Delta OYX$ ,  $\frac{2}{XY} = \tan 30^\circ = \frac{1}{\sqrt{3}}$

$$\Rightarrow XY = 2\sqrt{3} \text{ m}$$

(iii) (a)



$AS = AP$  --- (i)

$BQ = BP$  --- (ii)

$CQ = CR$  --- (iii)

$DR = DS$  --- (iv)

Adding and rearranging (i), (ii), (iii) and (iv), we get

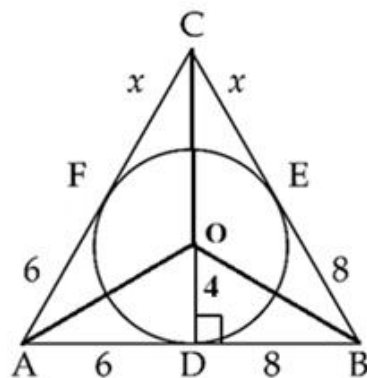
$$AB + CD = AD + BC$$

$$3 + CD = 5 + 5$$

$$CD = 10 - 3 = 7 \text{ m}$$

**OR**

(iii) (b)



|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                          |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
|      | <p>Let <math>CF = CE = x</math> m</p> <p><math>AD = AF = 6</math> m</p> <p><math>BD = BE = 8</math> m</p> <p>Area of triangle <math>= 84 = \frac{1}{2} \times (6 + 8) \times 4 + \frac{1}{2} \times (6 + x) \times 4 + \frac{1}{2} \times (8 + x) \times 4</math></p> <p><math>\Rightarrow x = 7</math></p> <p>So, <math>AC = 6 + 7 = 13</math> cm and <math>BC = 8 + 7 = 15</math> cm</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> |
| 38.  |  <p>Essel World is one of India's largest amusement park that offers a diverse range of thrilling rides and water attractions for visitors of all ages. The entry ticket charges for the park is ₹ 150 per child and ₹ 250 per adult.</p> <p>On a day cashier of park found that 300 tickets were sold and an amount of ₹ 55,000 was collected.</p> <p>Based on the above, answer the following questions :</p> <p>(i) If number of children visited be <math>x</math>, the number of adults visited be <math>y</math>, write the given situation algebraically.</p> <p>(ii) How many children visited the park that day ?</p> <p>(iii) (a) How many adults visited the park that day ? If there were 50 more adults that day, how much money would have been collected from adults ?</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) How many adults visited the park that day ? If a special show was arranged and hence the per ticket rate for adults was increased by ₹ 100, totally how much money will be collected ?</p> |                                                                          |
| Sol. | <p>(i) <math>x + y = 300</math> --- (I)</p> <p><math>150x + 250y = 55000</math> --- (II)</p> <p>(ii) Solving (I) &amp; (II), we get <math>x = 200</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> |

|  |                                                                   |   |
|--|-------------------------------------------------------------------|---|
|  | (iii) (a) from (I), $y = 100$                                     | 1 |
|  | Money collected from adults $= (100 + 50) \times 250 = ₹ 37500$   | 1 |
|  | <b>OR</b>                                                         |   |
|  | (iii) (b) from (I), we get $y = 100$                              | 1 |
|  | Total money collected $= 100 \times (250 + 100) + 200 \times 150$ |   |
|  | $= ₹ 65000$                                                       | 1 |