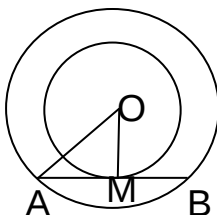


**Marking Scheme**  
**Class X Session 2024-25**  
**MATHEMATICS BASIC (Code No.241)**

**TIME: 3 hours**

**MAX.MARKS: 80**

| Q. No. | Section A                                                                                                | Marks |
|--------|----------------------------------------------------------------------------------------------------------|-------|
| 1.     | B) 90                                                                                                    | 1     |
| 2.     | A) consistent with unique solution                                                                       | 1     |
| 3.     | D) 7                                                                                                     | 1     |
| 4.     | C) $2\sqrt{a^2 + b^2}$                                                                                   | 1     |
| 5.     | D) $145^\circ$                                                                                           | 1     |
| 6.     | B) 15 cm                                                                                                 | 1     |
| 7.     | A) $\frac{5}{4}$                                                                                         | 1     |
| 8.     | B) $\triangle EAD$                                                                                       | 1     |
| 9.     | C) 3780                                                                                                  | 1     |
| 10.    | B) 40                                                                                                    | 1     |
| 11.    | D) $52^\circ$                                                                                            | 1     |
| 12.    | B) 5 cm                                                                                                  | 1     |
| 13.    | A) $\cos 60^\circ$                                                                                       | 1     |
| 14.    | (C) $3\pi r^2$                                                                                           | 1     |
| 15.    | D) 4                                                                                                     | 1     |
| 16.    | B) real and equal                                                                                        | 1     |
| 17.    | C) 30 - 40                                                                                               | 1     |
| 18.    | D) $25x^2 - 5x - 2$                                                                                      | 1     |
| 19.    | A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) | 1     |
| 20.    | C) Assertion (A) is true but reason (R) is false.                                                        | 1     |
|        | <b>Section B</b>                                                                                         |       |

|           |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-----------|---|---|----|----|---|---|-------------------------------------|
| 21 (A).   | $PA^2 = PB^2$<br>$\Rightarrow (x - 4)^2 + (y - 3)^2 = (x - 3)^2 + (y - 4)^2$<br>$\Rightarrow x = y \text{ or } x - y = 0$                                                                                                                                                                                                                                                                | 1<br>1                                                            |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
|           | OR                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 21 (B).   | AB = 6 cm = AC<br><br>OC = $\sqrt{36 - 9} = 3\sqrt{3}$ cm<br>Point C is $(3\sqrt{3}, 0)$                                                                                                                                                                                                                                                                                                 | $\frac{1}{2}$<br><br>1<br>$\frac{1}{2}$                           |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 22.       | <div>Correct figure</div> <div></div> <div>AM = 4 cm</div> <div><math>OM = \sqrt{OA^2 - AM^2}</math><br/><math>= \sqrt{5^2 - 4^2}</math><br/><math>= 3</math> cm</div>                                                                                                                                  | $\frac{1}{2}$<br><br><br><br>1                                    |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 23 (A).   | $\frac{12}{2} [2 \times 20 + 11d] = 900$<br>$\Rightarrow d = 10$<br>Also $a_{12} = 20 + 11 \times 10 = 130$                                                                                                                                                                                                                                                                              | $\frac{1}{2}$<br>1<br>$\frac{1}{2}$                               |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
|           | OR                                                                                                                                                                                                                                                                                                                                                                                       |                                                                   |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 23 (B).   | Putting $n = 1$ , $S_1 = a = 6 - 1^2 = 5 \dots\dots\dots (i)$<br>Putting $n = 2$ , $S_2 = 2a + d = 6 \times 2 - 2^2 = 8 \dots\dots\dots (ii)$<br>Solving (i) & (ii) $d = -2$                                                                                                                                                                                                             | $\frac{1}{2}$<br>1<br>$\frac{1}{2}$                               |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 24.       | $\sin(A - B) = \frac{1}{2} \Rightarrow A - B = 30^\circ \dots\dots\dots (i)$<br>$\cos(A + B) = \frac{1}{2} \Rightarrow A + B = 60^\circ \dots\dots\dots (ii)$<br>Solving (i) & (ii) to get $A = 45^\circ, B = 15^\circ$                                                                                                                                                                  | $\frac{1}{2}$<br><br>$\frac{1}{2}$<br>$\frac{1}{2} + \frac{1}{2}$ |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |
| 25.       | <table border="1"><tr><td>Class</td><td>5-10</td><td>10-15</td><td>15-20</td><td>20-25</td><td>25-30</td><td>30-35</td></tr><tr><td>Frequency</td><td>5</td><td>6</td><td>15</td><td>10</td><td>5</td><td>4</td></tr></table> <div>Modal class is 15-20.</div> <div><math>Mode = 15 + 5 \times (\frac{15-6}{2 \times 15 - 6 - 10})</math><br/><math>= 18.21(\text{approx.})</math></div> | Class                                                             | 5-10  | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | Frequency | 5 | 6 | 15 | 10 | 5 | 4 | $\frac{1}{2}$<br>1<br>$\frac{1}{2}$ |
| Class     | 5-10                                                                                                                                                                                                                                                                                                                                                                                     | 10-15                                                             | 15-20 | 20-25 | 25-30 | 30-35 |       |       |           |   |   |    |    |   |   |                                     |
| Frequency | 5                                                                                                                                                                                                                                                                                                                                                                                        | 6                                                                 | 15    | 10    | 5     | 4     |       |       |           |   |   |    |    |   |   |                                     |
|           | Section-C                                                                                                                                                                                                                                                                                                                                                                                |                                                                   |       |       |       |       |       |       |           |   |   |    |    |   |   |                                     |





|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                    |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 31.     | <p>Let the two-digit number be <math>10x + y</math><br/> Therefore <math>(10x + y) + (10y + x) = 99</math><br/> <math>\Rightarrow x + y = 9</math> .....(i)<br/> Also, <math>x = 3 + y</math>.....(ii)<br/> Solving (i) &amp; (ii) to get <math>y = 3, x = 6</math><br/> Therefore, required number is 63</p>                                                                                                                                                                                                                   | $\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$<br>$\frac{1}{2}$ |
|         | <b>Section D</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                    |
| 32 (A). | <p>Let the number of books purchased be <math>x</math><br/> Therefore, cost price of 1 book = <math>\frac{1920}{x}</math><br/> Therefore <math>\frac{1920}{x} - \frac{1920}{x+4} = 24</math><br/> <math>\Rightarrow 1920 \times 4 = 24x(x + 4)</math><br/> or <math>x^2 + 4x - 320 = 0</math><br/> <math>\Rightarrow (x + 20)(x - 16) = 0</math><br/> <math>\Rightarrow x = 16, x \neq -20</math><br/> Number of books bought=16<br/> Price of each book = <math>\frac{1920}{16} = ₹120</math></p>                              | 1<br>1<br>1<br>1<br>1                                                                              |
|         | <b>OR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                    |
| 32 (B). | <p>Let the initial average speed of the train be <math>x</math> km/hr.<br/> Therefore <math>\frac{132}{x} + \frac{140}{x+4} = 4</math><br/> <math>\Rightarrow 4x^2 - 256x - 528 = 0</math><br/> or <math>x^2 - 64x - 132 = 0</math><br/> <math>\Rightarrow (x - 66)(x + 2) = 0</math><br/> <math>\Rightarrow x = 66, x \neq -2</math><br/> Initial average speed of train= 66 km/hr<br/> <br/> Time taken to cover the distances separately=<math>\frac{132}{66}</math> &amp; <math>\frac{140}{70}</math> i.e. 2 hours each</p> | 1<br>1<br>1<br>1<br>1                                                                              |
| 33.     | <p>Correct Given, to prove, Construction and figure<br/> Correct Proof</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $\frac{1}{2} \times 4 = 2$<br>3                                                                    |
| 34.     | <p>(i) Perimeter of sector = <math>2r + \frac{2\pi r\theta}{360} = 73.12</math><br/> <math>\Rightarrow 2(24) + \frac{2 \times 3.14 \times 24 \times \theta}{360} = 73.12</math><br/> <math>\Rightarrow \theta = 60^\circ</math><br/> (ii) Area of minor segment = <math>\left( \frac{3.14 \times 24 \times 24 \times 60}{360} - \frac{1.73}{4} \times 24 \times 24 \right) cm^2</math><br/> = <math>(301.44 - 249.12) cm^2</math><br/> = <math>52.32 cm^2</math></p>                                                            | 1<br>1<br>2<br>1                                                                                   |

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                         |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>35 (A).</b></p> | <div> </div> <p>Let AB be the building and CD be the tower.</p> <p>Here <math>\tan 60^\circ = \sqrt{3} = \frac{h}{x}</math></p> <p><math>\Rightarrow h = x\sqrt{3} \dots \dots \dots (i)</math></p> <p><math>\tan 45^\circ = \frac{9}{x} = 1</math></p> <p><math>\Rightarrow x = 9 \text{ m} \dots \dots \dots (ii)</math> ( Distance between tower and building)</p> <p>Solving (i) &amp; (ii) to get <math>h = 9 \times 1.732 = 15.588\text{m}</math></p> <p>Therefore, the height of the tower = <math>h + 9 = 24.588 \text{ m}</math>.</p>                                            | <p><b>1 mark for correct figure</b></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> |
|                       | <p><b>OR</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                         |
| <p><b>35 (B).</b></p> | <div> </div> <p>Let AB be the light house and C &amp; D be positions of ships.</p> <p><math>\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{75}{x+y}</math></p> <p><math>\Rightarrow x + y = 75\sqrt{3} \dots \dots \dots (i)</math></p> <p><math>\tan 45^\circ = 1 = \frac{75}{y}</math></p> <p><math>\Rightarrow y = 75 \dots \dots \dots (ii)</math></p> <p>Solving (i) &amp; (ii) to get <math>x = 75(\sqrt{3} - 1)</math></p> <p><math>\Rightarrow x = 75 \times 0.732</math></p> <p><math>= 54.9 \text{ m}</math></p> <p>Distance between the ships is <math>54.9 \text{ m}</math></p> | <p><b>1 mark for correct figure</b></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p>                                                 |
|                       | <p><b>Section E</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                         |
| <p><b>36.</b></p>     | <p>(i) Number of students who do not prefer to walk = <math>200 - 120 = 80</math></p> <p>P (selected student doesn't prefer to walk) = <math>\frac{80}{200}</math> or <math>\frac{2}{5}</math></p>                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>                                                                                                                                         |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                 |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|            | <p>(ii) Total number of students who prefer to walk or use bicycle = <math>120 + 50 = 170</math></p> <p>P (selected student prefers to walk or use bicycle) = <math>\frac{170}{200}</math> or <math>\frac{17}{20}</math></p> <p>(iii) (A) 50% of walking students who used bicycle = 60<br/> Number of students who already use bicycle = 50<br/> P (selected student uses bicycle) = <math>\frac{110}{200}</math> or <math>\frac{11}{20}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) Number of students who preferred to be dropped by car<br/> = <math>200 - (120 + 50 + 20)</math><br/> = 10 students</p> <p>P (selected student is dropped by car) = <math>\frac{10}{200}</math> or <math>\frac{1}{20}</math></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> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>                                                                 |
| <b>37.</b> | <p>(i) 1 and 4</p> <p>(ii) <math>x = 5/2</math></p> <p>(iii) (A) At <math>x = 5/2</math>, <math>p(x) = 2.25</math><br/> Therefore, <math>h = 0.10 + 2.25 = 2.35m</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) <math>-x^2 + 5x - 4 = 2</math><br/> <math>x^2 - 5x + 6 = 0</math><br/> <math>(x - 2)(x - 3) = 0</math><br/> <math>\Rightarrow x = 2 \text{ and } x = 3</math><br/> Therefore, required points are (2,0) and (3,0)</p>                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></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>38.</b> | <p>(i) <math>l^2 = (1.2)^2 + (0.5)^2</math><br/> = <math>1.44 + 0.25</math><br/> <math>\Rightarrow l = \sqrt{1.69} = 1.3cm</math></p> <p>(ii) Curved surface area of sharpened part<br/> = <math>\pi \times 0.5 \times 1.3</math><br/> = <math>(0.65 \pi) cm^2</math></p> <p>(iii) (A) Total surface area of pencil<br/> = CSA of cylinder + CSA of cone + area of base circle<br/> = <math>\pi \times 0.5 \times 0.5 \times 21 + 0.65 \pi + \pi \times (0.5)^2</math><br/> = <math>(5.25 + 0.65 + 0.25)\pi</math><br/> = <math>(6.15 \pi) cm^2</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) Length of cylindrical part of shortened pencil<br/> = <math>(21 - 8.2) cm = 12.8 cm</math><br/> So, volume of cylindrical part of shortened pencil<br/> = <math>\pi \times 0.5 \times 0.5 \times 12.8</math><br/> = <math>(3.2 \pi) cm^3</math></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> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> |