

## Ziel classes

### COMMON EXAMINATION Class-10 MATHEMATICS – BASIC (241)

Time Allowed: 3 Hours

Maximum Marks :80

Roll No.:

CODE - II

Date:

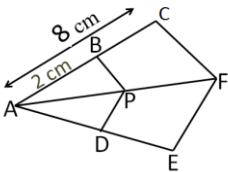
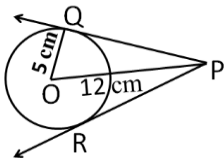
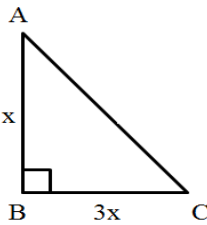
General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

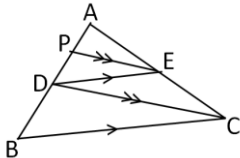
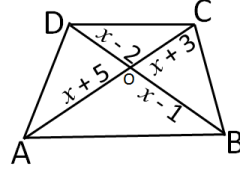
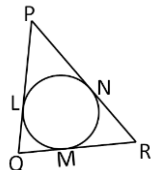
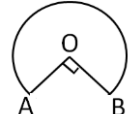
#### SECTION - A

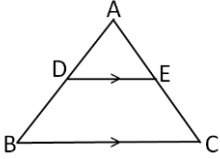
Section A consists of 20 questions of 1 mark each.

SN		Marks
1.	If the product of two numbers is 1080 and their LCM is 60, then their HCF is (a) 30                      (b) 18                      (c) 45                      (d) 90	1
2.	The LCM of the smallest 2 digit composite number and the smallest composite number is (a) 12                      (b) 20                      (c) 4                      (d) 44	1
3.	If the zeroes of the polynomial $5x^2 - 7x + k$ are reciprocal of each other, then the value of 'k' is (a) 5                      (b) 2                      (c) 1/5                      (d) 1	1
4.	The lines represented by the equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are coincident if (a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (d) None of these	1
5.	The value of 'p' for which $px^2 + 5x - 3 = 0$ has $x = -3$ as its root is (a) 1                      (b) 2                      (c) 4                      (d) 6	1
6.	One end of the diameter of a circle is (2, 3) and its centre is (-2,5). Then the coordinates of the other end of the diameter are (a) (-6,7)                      (b) (-6, -7)                      (c) (6,7)                      (d) (6, -7)	1

7.	If $PB \parallel CF$ and $DP \parallel EF$ , then $\frac{AD}{DE} =$  (a) $\frac{3}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{2}{3}$		1
8.	The y- axis divides the line segment joining $(-4,5)$ and $(3,-7)$ in the ratio of (a) $2 : 7$ (b) $3 : 7$ (c) $4 : 3$ (d) $3 : 4$		1
9.	O is the centre of the circle of radius $5\text{cm}$ . If $OP = 12\text{cm}$ , then PQ is (a) $13\text{ cm}$ (b) $12\text{ cm}$ (c) $\sqrt{119}\text{ cm}$ (d) $\sqrt{159}\text{ cm}$		1
10.	If $5\tan\theta - 4 = 0$ , then $\frac{5\sin\theta - 4\cos\theta}{5\sin\theta + 4\cos\theta} =$ (a) $\frac{5}{3}$ (b) $\frac{5}{6}$ (c) $0$ (d) $\frac{1}{6}$		1
11.	If $x = 2\sin^2\theta$ and $y = 2\cos^2\theta + 1$ then $x + y =$ (a) $0$ (b) $1$ (c) $2$ (d) $3$		1
12.	In the figure, $\cos A + \sin C =$ (a) $\frac{1}{\sqrt{10}}$ (b) $\frac{2}{\sqrt{10}}$ (c) $2\sqrt{2}$ (d) $\frac{1}{2\sqrt{2}}$		1
13.	The distance covered (in m) by a wheel of diameter $35\text{cm}$ in one revolution is (a) $2.2$ (b) $1.1$ (c) $9.625$ (d) $96.25$		1
14.	The circumferences of 2 concentric circles forming a ring are $88\text{cm}$ and $66\text{ cm}$ respectively. The width of the ring is (a) $14\text{ cm}$ (b) $7\text{ cm}$ (c) $\frac{7}{2}\text{ cm}$ (d) $21\text{ cm}$		1
15.	Two cones with same base radius $8\text{ cm}$ and height $15\text{ cm}$ are joined together along their bases. The surface area of the solid formed is (a) $800\text{ cm}^2$ (b) $900\text{ cm}^2$ (c) $855\text{ cm}^2$ (d) $560\text{ cm}^2$		1

16.	If the mean of the following frequency distribution is 5, then the value of 'p' is	1												
	<table border="1"> <tbody> <tr> <td><math>x_i</math></td> <td>2</td> <td>4</td> <td>6</td> <td>10</td> <td><math>p + 5</math></td> </tr> <tr> <td><math>f_i</math></td> <td>3</td> <td>2</td> <td>2</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	$x_i$	2	4	6	10	$p + 5$	$f_i$	3	2	2	1	1	
$x_i$	2	4	6	10	$p + 5$									
$f_i$	3	2	2	1	1									
	(a) 7                      (b) 8                      (c) 9                      (d) 4													
17.	The median class for the following data is	1												
	<table border="1"> <tbody> <tr> <td>Class</td> <td>20-40</td> <td>40-60</td> <td>60-80</td> <td>80-100</td> </tr> <tr> <td>Frequency</td> <td>10</td> <td>12</td> <td>20</td> <td>22</td> </tr> </tbody> </table>	Class	20-40	40-60	60-80	80-100	Frequency	10	12	20	22			
Class	20-40	40-60	60-80	80-100										
Frequency	10	12	20	22										
	(a) 20-40                      (b) 40-60                      (c) 60-80                      (d) 80-100													
18.	A bag contains 5 red, 4 blue and 3 green balls. The probability that a ball taken at random from the bag is not of green colour is	1												
	(a) $\frac{5}{12}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{4}$													
	<b>Direction for questions 19 &amp; 20:</b> In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.													
19.	<p><b>Assertion:</b> There are two whole numbers 'a' and 'b' such that <math>HCF(a, b) = 26</math> and <math>LCM(a, b) = 91</math></p> <p><b>Reason :</b> The HCF of two or more numbers is always a factor of their LCM.</p> <p>(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).  (c) Assertion (A) is true but Reason (R) is false.  (d) Assertion (A) is false but Reason (R) is true.</p>	1												
20.	<p><b>Assertion:</b> The point <math>(-1, 2)</math> divides the line joining the points <math>P(2, 5)</math> and <math>Q(-5, -2)</math> in the ratio 3 : 4</p> <p><b>Reason :</b> The distance of a point from the origin is <math>\sqrt{x^2 + y^2}</math></p> <p>(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).  (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).  (c) Assertion (A) is true but Reason (R) is false.  (d) Assertion (A) is false but Reason (R) is true.</p>	1												
	<b>SECTION – B</b>													
	<b>Section B consists of 5 questions of 2 marks each.</b>													
21.	For what value(s) of k, will the lines represented by the following pair of linear equations be parallel?  $3x - y - 5 = 0$ and $6x - 2y - k = 0$	2												

22.	<p>In the given figure, <math>DE \parallel BC</math>, <math>PE \parallel DC</math>,  <math>AP = 4\text{cm}</math>, <math>AB = 16\text{cm}</math>. Find AD.</p> <p style="text-align: center;"><b>[OR]</b></p> <p>In the figure, if <math>AB \parallel DC</math> find the value of 'x'.</p>	  	2
23.	<p>A circle is inscribed in a <math>\Delta PQR</math> with <math>PQ=10\text{cm}</math>, <math>QR=8\text{cm}</math> and <math>PR = 12\text{cm}</math>. Find QM, RN and PL.</p>		2
24.	<p>Evaluate: <math>\frac{2\text{cosec}^2 30^\circ + 3\text{sin}^2 60^\circ - \text{tan}^2 30^\circ}{\text{sin}^2 60^\circ + \text{cos}^2 60^\circ}</math></p>		2
25.	<p>In the given figure, the shape of the top of a table is that of a sector of a circle with centre 'O' and <math>\angle AOB = 90^\circ</math>.          If <math>AO = OB = 42\text{cm}</math>, then find the perimeter of the top of the table.</p> <p style="text-align: center;"><b>[OR]</b></p> <p>Find the angle subtended at the centre of a circle of radius 6cm by an arc of length <math>6\pi</math> cm.</p>		2
<b>Section C</b>			
<b>Section C consists of 6 questions of 3 marks each.</b>			
26.	<p>Prove that <math>\sqrt{7}</math> is an irrational number.</p>		3
27.	<p>If <math>\alpha</math> and <math>\beta</math> are the zeroes of the polynomial <math>p(x) = 6x^2 + x - 12</math>, then find a quadratic polynomial whose zeroes are <math>\alpha + 2</math> and <math>\beta + 2</math>.</p>		3
28.	<p>The ratio of incomes of two persons is 11 : 7 and the ratio of their expenditures is 9 : 5. If each of them manages to save Rs. 400 per month, find their monthly incomes.</p> <p style="text-align: center;"><b>[OR]</b></p> <p>Half the perimeter of a rectangular garden, whose length is 12m more than its width, is 60m. Find the dimensions of the garden.</p>		3
29.	<p>Prove that the angle between two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segments joining the points of contact at the centre.</p>		3
30.	<p>Prove that <math>\frac{\text{cosec } A}{\text{cosec } A - 1} + \frac{\text{cosec } A}{\text{cosec } A + 1} = 2\text{sec}^2 A</math></p>		3

	<b>[OR]</b>																	
	$\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$																	
31.	A card is drawn at random from a well shuffled deck of cards. Find the probability that the drawn card is a) a red card b) a non ace card c) a king or a jack	3																
	<b>Section D</b>																	
	<b>Section D consists of 4 questions of 5 marks each.</b>																	
32.	A passenger train takes 2 hours less for a journey of 300km if its speed is increased by 5km/hr from its usual speed. Find the usual speed of the train. <b>[OR]</b> The sum of the reciprocals of Radha's ages (in years) 3 years ago and 5 years from now is $\frac{1}{3}$ . Find her present age.	5																
33.	(i) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio – prove.  (ii) In the figure, $DE \parallel BC$ . If $AD=1.7\text{cm}$ , $AB=6.8\text{ cm}$ and $AC=9\text{cm}$ , find $AE$ .	5																
																		
34.	A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are $2.1\text{m}$ and $4\text{m}$ respectively, and the slant height of the top is $2.8\text{m}$ , find the area of the canvas used for making the tent. Find the cost of the canvas of the tent at the rate of Rs.500 per $\text{m}^2$ .  <b>[OR]</b> A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are $15\text{cm}$ by $10\text{cm}$ by $3.5\text{cm}$ . The radius of each of the depressions is $0.5\text{cm}$ and the depth is $1.4\text{cm}$ . Find the volume of wood in the entire stand.	5																
35.	The distribution below gives the weight of 30 students of a class. Find the median weight of the students	5																
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Weight (in kg)</td> <td>40-45</td> <td>45-50</td> <td>50-55</td> <td>55-60</td> <td>60-65</td> <td>65-70</td> <td>70-75</td> </tr> <tr> <td>No. of students</td> <td>2</td> <td>3</td> <td>8</td> <td>6</td> <td>6</td> <td>3</td> <td>2</td> </tr> </tbody> </table>	Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	No. of students	2	3	8	6	6	3	2	
Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75											
No. of students	2	3	8	6	6	3	2											
	<b>SECTION - E</b>																	

**Case study based questions are compulsory.**

36. **Case Study – 1**

Prasanna is celebrating his birthday. He invited his friends. He bought a packet of candies. He arranged the candies such that in the first row there are 3 candies, in the second row there are 5 candies, in the third row there are 7 candies and so on.



Based on the above information, answer the following questions.

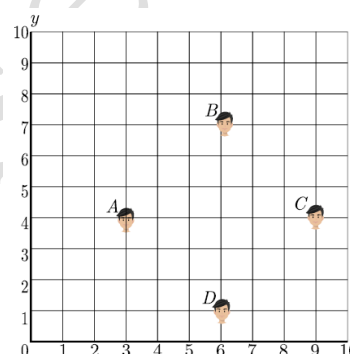
- |       |   |   |
|-------|---|---|
| (i)   | How many candies are placed in the 9 <sup>th</sup> row?   | 1 |
| (ii)  | Find the difference in the number of candies placed in 7 <sup>th</sup> and 3 <sup>rd</sup> row. | 1 |
| (iii) | How many rows are needed to place a total of 63 candies?  | 2 |

**[OR]**

In which row, 31 candies can be placed.

37. **Case Study – 2**

Morning assembly is an integral part of the school's schedule. All the activities carried out in morning assembly by the school staff and students have a great influence in every point of life. Suppose a school has 100 students and they all assemble for prayer in 10 rows as shown in the figure. Based on the above information, answer the following questions.



- |       |  |   |
|-------|--|---|
| (i)   | Find the coordinates of B and C.                   | 1 |
| (ii)  | Name the shape formed by the points A, B, C and D? | 1 |
| (iii) | Find the perimeter and area of ABCD .              | 2 |

**[OR]**

Find the coordinates of the points of trisection of the line segment AD.

38. **Case Study – 3**

One day while sitting on the bridge across a river, Ajith observes the angles of depression of the banks on opposite sides of the river to be 30° and 60° respectively as shown in the figure.



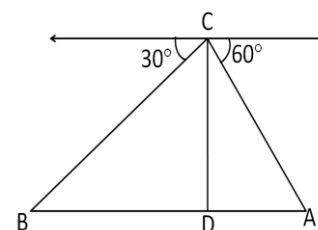
Based on the above information, answer the following

(use  $\sqrt{3} = 1.73$ )

- |       |   |   |
|-------|---|---|
| (i)   | If the bridge is at a height of 6m, then find AD                          | 1 |
| (ii)  | If BD=21m, then find the height of the bridge.                            | 1 |
| (iii) | If the height of the bridge is doubled, then find the width of the river. | 2 |

(OR)

If the bridge is at a height of 6m and the angles of depression of the banks on opposite sides are 45° each, then find the width of the river.



**End of Paper**