

LXWI73F

SET B
SUMMATIVE ASSESSMENT - I, 2016-17
MATHEMATICS
Class - X

Time Allowed: 3 hours

Maximum Marks: 90

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

SECTION-A

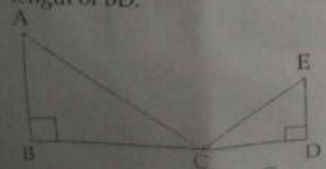
Question numbers 1 to 4 carry one mark each

1. In ΔXYZ , P and Q are two points on the sides XY and XZ respectively such that $PQ \parallel YZ$. If $XP = x$, $PY = 3\text{cm}$, $XQ = 12\text{cm}$ and $QZ = x$, then find the value of x. 1
2. If $\tan \theta = \frac{1}{\sqrt{3}}$, find the value of $\sin(90^\circ - \theta)$. 1
3. Find the value of $\sin^2 \theta + \frac{1}{1 + \tan^2 \theta}$. 1
4. If mode = 10.6 and median = 11.5, then find mean, using an empirical relation. 1

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Can the number 6^n , n being a natural number, end with the digit 5? Give reasons. 2
6. What is the decimal expansion of the rational number $\frac{201}{250}$? 2
7. Given the linear equation $3x - 4y - 7 = 0$, write another linear equation in these two variables such that the geometrical representation of the pair so formed is: 2
 - (i) intersecting lines
 - (ii) parallel lines
8. In given figure $\angle B = \angle D = 90^\circ$. If $AB = 12\text{ cm}$, $AC = 13\text{ cm}$, $CE = 5\text{ cm}$ and $ED = 4\text{ cm}$, find the length of BD. 2



If $\sin(A+B) = \frac{\sqrt{3}}{2}$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$ where $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.

The mean and median of 100 observations are 50 and 52 respectively. The value of the largest observation is 100. It was later found that it is 110 not 100. Find the true mean and median.

SECTION-C

11. Question numbers 11 to 20 carry three marks each.
12. Find HCF of 306 and 657. Also find their LCM using their HCF. 3
13. Check whether polynomial $3x^2 - 5x + 2$ is a factor of the polynomial $3x^4 - 5x^3 - 10x^2 + 20x - 8$. Verify by division algorithm. 3

- ✓ 13 Find a quadratic polynomial, the sum and product of whose zeroes are 6 and 9 respectively. Hence find the zeroes. 3
- ✓ 14 Solve for x and y: 3
- 2x + y = 6
- 2x - y + 2 = 0
- ✓ 15 If in a right $\triangle ABC$, right angled at B, D is any point on BC, then prove that 3
- $AC^2 = AD^2 + DC^2 + 2 BD \cdot DC$.
- ✓ 16 ABCD is a rectangle in which length is double of its breadth. Two equilateral triangles are drawn one each on length and breadth of rectangle. Find the ratio of their areas. 3
- ✓ 17 If $\tan A + \cot A = 2$, then find the value of $\tan^2 A + \cot^2 A$. 3
- ✓ 18 Prove the identity: $\frac{\sin x - \tan x}{\sin x \cdot \tan x} = \frac{\cos x - 1}{\sin x}$. 3
- 19 3

✓ Check

Find the mean of the following distribution:

Height (in Cm)	Less than 75	Less than 100	Less than 125	Less than 150	Less than 175	Less than 200
No. of students	5	11	14	18	21	28
Height (in Cm)	Less than 225	Less than 250	Less than 275	Less than 300		
No. of students	33	37	45	50		

✓ 20 Check

The following data gives information on the observed life time (in hours) of 250 electrical components:

Life time (in hours)	0 - 20	20 - 40	40 - 60
No. of components	30	36	52
Life time (in hours)	60 - 80	80 - 100	100 - 120
No. of components	61	38	33

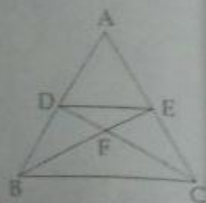
Determine the model life time of the component.

SECTION-D

- 21 Question numbers 21 to 31 carry four marks each. 4
- Show that one and only one out of n , $(n+1)$ and $(n+2)$ is divisible by 3, where n is any positive integer. 4
- 22 Obtain all other zeroes of the polynomial $x^4 + 3x^3 - 3x^2 - 15x - 10$, if two of its zeroes are $\sqrt{5}$ and $-\sqrt{5}$. 4
- Draw the graph of the following pair of linear equations: 4
- $x + 3y = 6$ and $2x - 3y = 12$
- Find the ratio of the areas of the two triangles formed by first line, $x=0$, $y=0$ and second line $x=0$, $y=0$ 4
- 23 DDA wants to make a rectangular park in the colony. If the length and breadth of the park is decreased by 2 m, then its area will be decreased by 196 square meters. Its area will be increased by 246 square meters if its length is increased by 3 m and its breadth is increased by 2 m. Find the length and breadth of the park. 4
- 24 What is the importance of parks in our life? 4
- 25 "In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle". Prove it. 4

lots of writing is left

26 In a $\triangle ABC$, $DE \parallel BC$. If $AD : DB = 3 : 5$, then find $\frac{\text{ar}(\triangle DFE)}{\text{ar}(\triangle CFB)}$ 4



27 Express $\sin A$, $\cos A$, $\text{cosec} A$ and $\sec A$ in terms of $\cot A$. 4

28 If $\sec \theta + \tan \theta = p$, prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$. 4

29 Prove that: 4

$$\left(\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} \right) \cdot \left(\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} \right) = 4 \sec A \cdot \text{cosec} A$$

30 Production yield per hectare of wheat of some farms of a village are given in the following table: 4

Production yield (in kg/ha)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85
Number of farms	1	9	15	18	40	26	16	14	10

31 Draw a 'less than type' ogive and a 'more than type' ogive for this data. 4

Following frequency distribution shows the daily expenditure incurred on milk by 80 families. If mean is ₹44, then find the missing frequencies x and y .

Daily expenditure (in ₹)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of families	1	12	15	9	x	13	y	8	4