

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 a $\triangle ABC$, $DE \parallel AB$; if
 $CD = x + 3$, $AD = 3x + 19$
 $CE = x$ and $BE = 3x + 4$, find the value of x . 1
2. Find the value of $\sin 38^\circ - \cos 52^\circ$. 1
3. Find the value of $\frac{1 - \cos \theta}{1 + \cos \theta}$, when $\theta = 0^\circ$. 1
4. Weekly household expenditure of families living in a housing society are shown below. 1

Weekly expenditure (in Rs.)	Up to 3000	3000 - 6000	6000-9000	9000 -12000	12000 -15000
No. of families	4	25	31	48	10

Find the upper limit of the modal class.

SECTION-B

Question numbers 5 to 10 carry two marks each.

5. Show that any positive odd integer is of the form $6q + 1$, $6q + 3$, or $6q + 5$, where q is some integer. 2
6. Write down the decimal expansion of $\frac{13}{64}$, without actual division. 2
7. Find whether the following pair of linear equations is consistent or inconsistent : 2
 $3x + 2y = 8$
 $6x - 4y = 9$
8. Two poles of heights 6m and 11m stand on a plane ground. If the distance between the feet of the poles is 12m, find the distance between their tops. 2
9. If $\sin 3A = \cos (A - 26^\circ)$ where $3A$ is an acute angle, find the value of A . 2

10

Given below is a grouped frequency distribution :

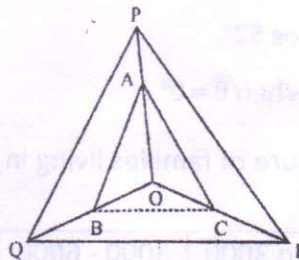
Class interval	100-150	150-200	200-250	250-300	300-350	350-400
Frequency	8	15	29	11	17	10

Make a cumulative frequency distribution table of 'less than type' for it.

SECTION-C

Question numbers 11 to 20 carry three marks each.

- 11 Find HCF of 90 and 126 by Euclid's division algorithm. Also find their LCM and verify that $LCM \times HCF = \text{Product of two numbers}$. 3
- 12 If $x^3 - 4x^2 + 5x - k$ is completely divisible by $x - 4$, then find the value of k . 3
- 13 Find the zeroes of the polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients. 3
- 14 Solve for x and y :
 $2x = 5y + 4$
 $3x - 2y + 16 = 0$ 3
- 15 In the given figure, A, B and C are points on OP, OQ and OR respectively such that $AB \parallel PQ$ and $AC \parallel PR$. Show that $BC \parallel QR$ 3



- 16 If the areas of two similar triangles are equal, prove that they are congruent. 3
- 17 If $\sin \theta = \frac{12}{13}$, $0^\circ < \theta < 90^\circ$, find the value of :

$$\frac{\sin^2 \theta - \cos^2 \theta}{2 \sin \theta \cdot \cos \theta} \times \frac{1}{\tan^2 \theta}$$
 3
- 18 Prove that $\sec A (1 - \sin A) (\sec A + \tan A) = 1$. 3
- 19 In an apple orchard, the number of apples on 80 trees are given below :

Number of apples	40-50	50-60	60-70	70-80	80-90	90-100
Number of trees	15	25	14	12	8	6

 Find the mean number of apples on a tree. 3
- 20 Determine missing frequency x , from the following data, when Mode is 67.

Class	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
Frequency	5	x	15	12	7

 3

SECTION-D

Question numbers 21 to 31 carry four marks each.

- 1 Three sets of English, Hindi and Mathematics books have to be stacked in such a way that all the books are stored topic-wise and the height of each stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books. 4
- 22 Find all the zeroes of the polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$ if it is given that two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$. 4
- 23 Draw the graph of the following equations : 4
 $x + y = 7$
 $2x - 3y = 9$
 Determine the coordinates of the vertices of the triangle formed by these lines and y - axis. Also shade the triangular region.
- 24 A lending library has a fixed charge for the first three days and additional charge for each day thereafter. Ram returned a book after one week and paid ₹ 40, while Shyam paid ₹ 60 as he returned it after eleven days. Find the fixed charge and the additional charge paid by them. Are you in favour of public libraries? 4
- 25 State and prove Pythagoras Theorem. 4
- 26 Prove that the area of the equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal. 4
- 27 If $3 \tan A = 4$ check whether $\frac{1 - \tan^2 A}{1 + \tan^2 A} = \cos^2 A - \sin^2 A$ or not. 4
- 28 Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$. 4
- 29 If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$, where $0^\circ < A+B < 90^\circ$, $A > B$, find A and B . 4
 Also calculate $\tan A \sin(A+B) + \cos A \tan(A-B)$.
- 30 The following are the ages of 200 patients getting medical treatment in a hospital on a particular day : 4

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of Patients	40	22	35	50	23	30

Write the above distribution as less than type cumulative frequency distribution and also draw an ogive to find the median.

- 31 Find the mean and median for the following data : 4

Class	0-4	4-8	8-12	12-16	16-20
Frequency	3	5	9	5	3

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