Tanishka
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HOLY CHILD AUXILIUM, NEW DELHI -110057

**SUMMATIVE ASSESSMENT – I (2016-17)**
**MATHEMATICS**
**Class – X – D**

**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 $\Delta ABC$, D and E are points on the sides AB and AC respectively such that DE||BC. If AE=5.4 cm, EC=3.6cm and AD = 3 cm, then find BD.

2. If $\tan\theta = \cot(45° + \theta)$, then find $\theta$. (Given $45° + \theta$ is an acute angle)

3. If $\sin\alpha = \frac{1}{2}$, then find value of $3\sin\alpha - 4\sin^3\alpha$.

4. In a certain distribution, mean and median are 9.5 and 10 respectively. Find the mode of the distribution, using an empirical relation.

## SECTION –B

**Question numbers 5 to 10 carry two marks each**

5. Use Euclid division algorithm to find if the following pair of numbers is co - prime :

   121, 573

6. After how many decimal places will the rational number $\frac{1251}{1250}$ terminate ?

7. Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident :

   $2x - 3y + 6 = 0$
   $4x - 5y + 2 = 0$

8. In equilateral $\Delta ABC$, point E lies on CA such that $BE \perp CA$. Find $AB^2+BC^2+CA^2$ in terms of $BE^2$.

9. Find the value of $4 \operatorname{cosec}^2 60° - 16 \tan^2 30°$.

10. The following table shows the daily consumption of milk in 40 houses of a locality :

| Consumption (in litres) | 0 - 0.5 | 0.5 - 1 | 1 - 1.5 | 1.5 - 2 | 2 - 2.5 |
|---|---|---|---|---|---|
| Number of houses | 7 | 15 | 10 | 5 | 3 |

Find the modal class and median class for the data.

## SECTION –C

**Question numbers 11 to 20 carry three marks each**

11. Find the largest number which divides 70 and 125 leaving remainder 5 and 8 respectively.

12. If $\alpha$ and $\beta$ are zeroes of a polynomial $2x^2-7x+6$, then form a quadratic polynomial whose zeroes are $\alpha+2$ and $\beta+2$.

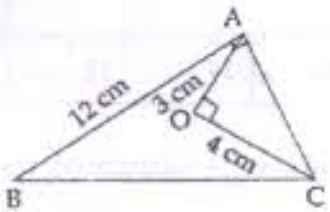
13. What must be subtracted from the polynomial $x^4-4x^3-39x^2-46x-2$ so that the resulting polynomial is exactly divisible by $x^2-5x+6$.

14. Solve for $x$ and $y$ :

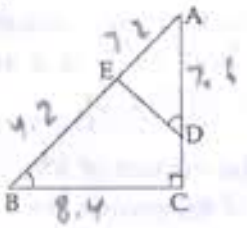
$3x + 5y = 12$

$3x - 5y + 18 = 0$

15. In given figure, OA=3 cm, OC=4 cm and AB=12 cm find perimeter of $\Delta ABC$.




16. In $\Delta ABC$, if $\angle ADE \cong \angle B$, then prove that $\Delta ADE \sim \Delta ABC$. Also, if AD=7.6 cm, AE=7.2 cm, BE=4.2 cm and BC=8.4 cm, then find DE.




17. If $\cos\theta : \sin\theta = 13 : 12$, then find the values of $\tan\theta$, $\operatorname{cosec}\theta$ and $\cos\theta$.

18. Prove that :

$$\frac{\tan\theta}{\sec\theta - 1} + \frac{\tan\theta}{\sec\theta + 1} = 2\,\operatorname{cosec}\theta$$

19. For the month of February, a class teacher of Class IX has the following absentee record for 30 students. Find the mean number of days, a student was absent.

| Number of days of absent | 0-4 | 4-8 | 8-12 | 12-16 | 16-20 | 20-24 |
|---|---|---|---|---|---|---|
| Number of students | 18 | 3 | 6 | 2 | 0 | 1 |

20. In an office, transport expenditures of 90 employees are given below :

| Expenditure on transport (in Rs) | 0-200 | 200-400 | 400-600 | 600-800 | 800-1000 | 1000-1200 |
|---|---|---|---|---|---|---|
| Number of employees | 14 | 19 | 15 | 11 | 20 | 11 |

Find the modal expenditure on transport.

## SECTION – D

**Question numbers 21 to 31 carry four marks each**

21. The product of two numbers $x$ and $y$ is 217728. Find the LCM and HCF of $x$ and $y$ if it is given that LCM $(x, y) = 42x$ HCF$(x, y)$.

22. Find all the zeroes of $x^4 - 5x^3 + x^2 + 15x - 12$, if it is given that two of its zeroes are 1 and 4.

23. Aditya is walking along the line joining (1, 4) and (0, 6), Aditi is walking along the line joining (3, 4) and (1, 0). Represent on graph and find the point where both of them cross each other.

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 Rs 40, while Shyam paid Rs 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 ?

25. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. In a $\Delta ABC$, the middle points of sides BC, CA and AB are D, E and F respectively. Find ratio of ar ($\Delta DEF$) to ar ($\Delta ABC$).

27. If $n \sin\theta = m \cos\theta$, then prove that

$$\frac{m\sin\theta - n\cos\theta}{m\sin\theta + n\cos\theta} + \frac{m\sin\theta + n\cos\theta}{m\sin\theta - n\cos\theta} = \frac{2(m^4 + n^4)}{m^4 - n^4}$$

28. Prove that :

$(\sin\theta + \cos\theta + 1).(\sin\theta - 1 + \cos\theta).\sec\theta.\operatorname{cosec}\theta = 2$

29. Prove that :

$$\frac{\tan A}{1 - \cot A} + \frac{\tan(90° - A)}{1 - \tan A} = 1 + \sec A \operatorname{cosec} A$$

30. The following observations are about the heights of 800 persons. Draw a 'less than type' ogive for the data :

| Height (in cm) | 135-140 | 140-145 | 145-150 | 150-155 | 155-160 | 160-165 | 165-170 | 170-175 |
|---|---|---|---|---|---|---|---|---|
| Number of persons | 50 | 70 | 80 | 150 | 170 | 100 | 95 | 85 |

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

| Daily expenditure (in Rs ) | 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 |

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