

BLUEBELLS SCHOOL INTERNATIONAL
KAILASH, NEW DELHI
SUMMATIVE ASSESSMENT I
CLASS X: (2016 - '17)
MATHEMATICS
SET - B

Maximum marks: 90

Time Allowed: 3 hours

- Please check that this question paper contains 5 printed pages
- Code number given on the top of the question paper should be written on the title page of the answer book by the candidate
- Please check this question paper contains 31 questions
- Please write down the serial number of the question before attempting it
- 15 minutes of time has been allotted to read this question paper

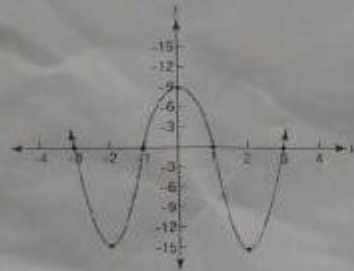
General Instructions:

- (i) All questions are compulsory.
- (ii) 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.
- (iii) There is no overall choice.
- (iv) Use of calculator is not permitted

SECTION A

Questions 1 to 4 carry 1 mark each

1. If a and b are two positive integers such that least prime factor of a is 3 and least prime factor of b is 5, then calculate the least prime factor of $(a + b)$.
2. If the sides of two similar triangles are in the ratio 4 : 9 then find the ratio of the areas of these two triangles.
3. For a given data with 70 observations the 'less than ogive' and the 'more than ogive' intersect at (20.5, 35). Find the median of the data.
4. The graph of $y = p(x)$ is shown in the figure below. How many zeros does $p(x)$ have? Name them.



SECTION B

Questions 5-10 carries 2 marks each

5. For what value of m , is the HCF of 65 and 117, expressible as $65m - 117$?

6. Prove that $\sqrt{3}$ is an irrational number

7. Find θ if $\tan 2\theta = \cot(\theta - 18)^\circ$, where 2θ and $(\theta - 18)^\circ$ are acute angles

8. A wire attached to the top of a vertical pole of height 18 m is 24 m long and has a stake attached at the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?

9. If two positive integers a and b are written as $a = x^2y$ and $b = x^4y^3$ where x and y are prime numbers then find the HCF and LCM of a and b .

10. Find the difference between the lower limit of median class and the upper limit of modal class.

Classes	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	1	3	5	9	7	3

1 4 9 18 25 28

SECTION C

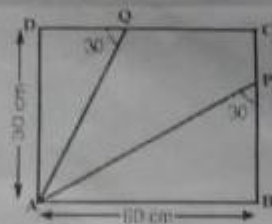
Questions 11-20 carries 3 marks each

11. If $\sec \theta = \frac{5}{4}$, show that $\frac{\sin \theta - 2 \cos \theta}{\tan \theta - \cot \theta} = \frac{12}{7}$

12. Find the mode for the given data

Class Intervals	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	5	7	10	3	0	3	0	7

13. In the figure, $ABCD$ is a rectangle in which segments AP and AQ are drawn. Find the length $(AP + AQ)$



14. Evaluate $\frac{3 \sec^2 30^\circ + 4 \cos^2 45^\circ + 5 \cos^2 90^\circ + \tan^2 60^\circ}{\sec 60^\circ - \cot^2 30^\circ + \operatorname{cosec} 30^\circ}$

15. Triangle ABC is right angled at B and D is the midpoint of BC . Prove that $AC^2 = 4AD^2 + 3AB^2$



17. Evaluate: $\frac{2}{5} \operatorname{cosec}^2 58^\circ - \frac{2}{3} \cot 58^\circ \tan 32^\circ - \frac{5}{3} \tan 13^\circ \tan 37^\circ \tan 45^\circ \tan 53^\circ \tan 77^\circ$

Or,

Evaluate: $\tan 10^\circ \tan 15^\circ \tan 75^\circ \tan 80^\circ$

18. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$ the quotient and the remainder were $x - 2$ and $(-2x + 4)$ respectively. Find $g(x)$.

19. If the equation $(a - b)x + (a + b)y = 3a + b - 2$ and $2x + 3y = 7$ has infinitely many solutions, then find the values of 'a' and 'b'.

20. The mean of the distribution is 54. Find the value of p .

class	0-20	20-40	40-60	60-80	80-100
frequencies	7	p	10	9	13

SECTION D

Questions 21 to 31 carries 4 marks each

21. In an equilateral triangle ABC, D is a point on BC such that $BD = \frac{1}{3} BC$.

Prove that $9AD^2 = 7 AB^2$.



22. Solve the following equations for x and y .

$$\begin{cases} \frac{10}{x+y} + \frac{2}{x-y} = 4 \\ \frac{15}{x+y} - \frac{5}{x-y} = 2 \end{cases}$$

23. Find all the zeroes of $2x^3 - 9x^2 + 5x - 1$, if two of its zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$.

24. State and prove Pythagoras Theorem.

25. The distribution of monthly wages of 200 folk dancers in Jaisalmer, Rajasthan is given below:

Monthly Wages (in Rupees)	800-1000	1000-1200	1200-1400	1400-1600	1600-1800
Number of folk dancers	25	30	20	45	80

Change the above distribution to a 'less than type' distribution and draw its ogive.

We in India have always considered music and dance as an indivisible part of our own tradition. What is the importance of preserving and valuing your own heritage and culture?

A musical instrument is played in Rajasthan that consists of two pairs of flat strips of wood and is used as an accompaniment to music as a percussion instrument. Name it.

26. Pocket money received by a group of 60 students per week in the form of frequency distribution is given below. The median of this distribution is 28.5, find the values of x and y .

Pocket money (₹)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No of Students	5	x	20	15	y	5

27. Use Euclid's Division Lemma to show that the cube of any positive integer is of the form $9m$, $9m + 1$ or $9m + 8$.
28. Prove that $\frac{\cot \phi + \operatorname{cosec} \phi - 1}{\cot \phi - \operatorname{cosec} \phi + 1} = \frac{1 + \cos \phi}{\sin \phi}$.
29. Draw the graphs of the equations $2x + y = 6$ and $2x - y + 2 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x axis and shade the triangular region.
30. In an acute angled triangle ABC $\sin(A+B-C) = \frac{1}{2}$ and $\cos(B+C-A) = \frac{1}{\sqrt{2}}$. Find all three angles, $\angle A$, $\angle B$ and $\angle C$ of the triangle.
31. 2 women and 5 men can finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work and also that taken by 1 man alone.

Or

The students of a class asked the age of the teacher. The teacher replied "My age is obtained by either multiplying the sum of digits of my age by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3." Find the age of the teacher.