Summative Assessment-1 2014-2015

Mathematics

Class – X

Time allowed: 3:00 hours Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) Question paper contains 31 questions divide into 4 sections A, B, C and D.
c) Question No. 1 to 4 are very short type questions, carrying 1 mark each. Question No. 5 to 10 are of short answer type questions, carrying 2 marks each. Question No. 11 to 20 carry 3 marks each. Question No. 21 to 31 carry 4 marks each.
d) There are no overall choices in the question paper.
e) Use of calculator is not permitted.

Section A

Question numbers 1 to 4 carry 1 mark each.

1. In ΔXYZ , A and B are points on the sides XY and XZ respectively such that $AB \| YZ$. If AY=2.2cm, XB=3.3cm and XZ=6.6cm, then find AX.
2. If $\tan\theta + \cot\theta = 2$, then find the value of $\tan^2\theta + \cot^2\theta$.
3. If $\theta = 45°$, then find the value of $2\sin^2\theta + 3\cos ec^2\theta$?
4. Life time of electric bulbs are given in the following frequency distribution:

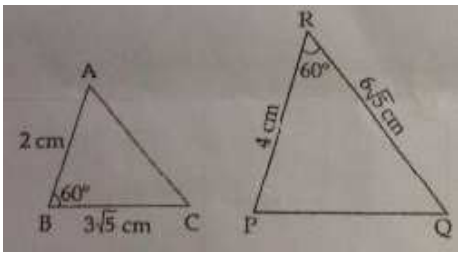
Life time (in hours)	250-300	300-350	350-400	400-450	450-500
Number of bulbs	5	14	21	12	10

Find the class mark of the modal class interval.

Section B

Question numbers 5 to 10 are two marks each.

5. Find whether decimal expansion of $\frac{13}{64}$ is a terminating or non-terminating decimal. If it terminates, find the number of decimal places its decimal expansion has.
6. Write the decimal expansion of $\frac{27}{1250}$ without actual division.
7. If α and β are the zeroes of a polynomial $9y^2 + 12y + 4$, then find the value of $\alpha + \beta + \alpha\beta$.
8. Are the given figures similar? Give reason.



9. Simplify: (1-sin A)(tan A + sec A)
10. The following distribution shows the daily pocket allowance of children of a locality:

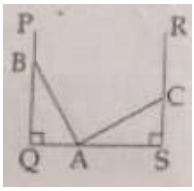
Daily pocket allowance (in Rs.)	12	15	20	25	30
Number of children	8	7	15	6	4

Find the median of the data.

Section C

Question numbers 11 to 20 carry three marks each.

11. Prove that $\sqrt{3}+\sqrt{5}$ is an irrational number.
12. Solve for x and y:
    x+4y=27xy
    x+2y=21xy
13. Determine graphically whether the following pair of linear equations
    2x-3y=8
    4x-6y=16 has
    a) A unique solution,
    b) Infinitely many solution or
    c) No solution
14. If $4x^4+7x^3-4x^2-7x+k$ is completely divisible by x^3-x, then find the value of k.
15. As shown in the figure, a 26m long ladder is placed at A. if it is placed along wall PQ, it reaches a height of 24m whereas it reaches a height of 10m if it is placed against wall RS. Find the distance between the walls.



16. If in ΔABC, AD is median and $AM \perp BC$, then prove that $AB^2+AC^2=2AD^2+\frac{1}{2}BC^2$
17. Prove that: $\frac{sin^2 A}{\cos^2 A}+\frac{\cos^2 A}{\sin^2 A}=\sec^2 A\cdot \cos ec^2 A-2$
18. In ΔABC, right angled at C, if $\tan A=\frac{1}{\sqrt{3}}$, show that sin A. cos B + cos A. sin B=1

19. In a study on asthmatic patients, the following frequency distribution was obtained. Find the average (mean) age at the detection.

Age at detection (in years)	0-9	10-19	20-29	30-39	40-49
Number of patients	12	25	13	10	5

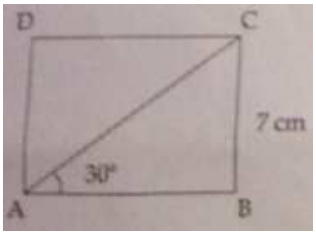
20. For the following distribution, draw a 'less than type' ogive and from the curve, find the median.

Marks obtained	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80	Less than 90	Less than 100
Number of students	2	7	17	40	60	82	85	90	100

Section D

Question numbers 21 to 31 carry four marks each.

21. Dhudnath has two vessels containing 720 ml and 405 ml of milk respectively. Milk from these containers is poured into glasses of equal capacity to their brim. Find the minimum number of glasses that can be filled.
22. The ratio of incomes of two persons A and B is 9:7and the ratio of their expenditure is 4:3. If their savings are Rs. 200 per month, find their monthly incomes.
    Why is it necessary to save money?
23. 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.
24. A boat goes 30 km upstream and 20 km downstream in 7 hours. In 6 hours, it can go 18 km upstream and 30 km downstream. Determine the speed of the stream and that of the boat in still water.
25. In ΔABC, $AD \perp BC$ and D lies on BC such that 4DB=CD, then proves that $5AB^2 = 5AC^2 - 3BC^2$
26. ABC is an isosceles triangle in which $\angle B = 90°$ and $AC = 3\sqrt{2}m$. Two equilateral triangles ACP and ABQ are drawn on the sides AC and AB. Find the ratio of area (ΔABQ) and area (ΔACP).
27. In the adjoining figure, ABCD is a rectangle with breadth BC=7cm and $\angle CAB = 30°$. Find the length of side AB of the rectangle and length of diagonal AC. If the $\angle CAB = 60°$, then what is the size of the side AB of the rectangle (use $\sqrt{3} = 1.73$ and $\sqrt{2} = 1.41$, if required)



28. If $a\cos\theta - b\sin\theta = c$, then prove that $a\sin\theta + b\cos\theta = \pm\sqrt{a^2 + b^2 - c^2}$

29. Given that $\sin(A-B) = \sin A \cdot \cos B - \cos A \cdot \sin B$. Find the value of $\sin 15°$ in two ways.
    a) Taking $A = 60°, B = 45°$, and
    b) Taking $A = 45°, B = 30°$
30. A class test in mathematics was conducted for class VI of a school. Following distribution gives marks (out of 60) of students:

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of students	8	22	12	10	5	3

    Find the mean of the marks obtained.
31. In an examination, 150 students appeared, and their marks (out of 200) are given in the following distribution. Find the missing frequencies x and y, when it is given that mean marks is 103.

Marks	0-25	25-50	50-75	75-100	100-125	125-150	150-175	175-200
Number of students	2	10	x	30	y	15	12	4