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SUMMATIVE ASSESSMENT - I (2016 - 17)

CLASS - X

MATHEMATICS

Time: 3 hrs

Max. Marks:90

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 31 questions divided into 4 sections.

SECTION - A (1 MARK EACH)

- Q1. If α and β are the zeroes of $f(x) = px^2 - 2x + p$ and $\alpha + \beta = \alpha\beta$, then find the value of 'p'. 3/4
- Q2. At what point will the line $x - y = 8$ intersect the y axis?
- Q3. If $\tan x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$, then find 'x'.
- Q4. For the following distribution, find the modal class:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	3	12	27	57	75	80

SECTION - B (2 MARKS EACH)

- Q5. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a and b being prime numbers, then find the L.C.M. of p and q.
- Q6. Using Euclid's division algorithm, find whether 231 and 396 are coprimes or not. Give reasons.
- Q7. If one of the zeroes of the quadratic polynomial $f(x) = 14x^2 - 42kx - 9$ is ^{the} negative of the other, find the value of 'k'.
- Q8. Is the pair of equations $x + 2y - 3 = 0$ and $6y + 3x - 9 = 0$ consistent? Justify your answer.
- Q9. P and Q are the points on the sides DE and DF of a triangle DEF such that DP=5cm, DE=15cm, DQ=6cm and QF=18cm. Is PQ parallel to EF? Give reasons for your answer.
- Q10. Write the following distribution as less than type cumulative frequency distribution:

Class Interval	140-145	145-150	150-155	155-160	160-165	165-170
Frequency	10	8	20	12	6	4

23/30

SECTION-C (3 MARKS EACH)

- Q11. Prove that $\sqrt{5}$ is irrational.
- Q12. If α and β are the two zeroes of $f(x) = 2x^2 - 4x + 6$, find a quadratic polynomial whose zeroes are $\frac{\alpha}{\beta^2}$ & $\frac{\beta}{\alpha^2}$.
- Q13. Represent the following system of linear equations graphically:
 $3x + y - 5 = 0$; $2x - y - 5 = 0$
 From the graph, find the points where the lines intersect y-axis.
- Q14. The perpendicular from A on side BC of a $\triangle ABC$ intersects BC at D such that $DB = 3CD$. Prove that $2AB^2 = 2AC^2 + BC^2$.

- Q15. Legs (other than the hypotenuse) of a right triangle are of lengths 16cm and 8cm. Find the length of the side of the largest square that can be inscribed in the triangle.
- Q16. Without using trigonometric tables, evaluate
 $\left(\frac{\tan 20^\circ}{\operatorname{cosec} 70^\circ}\right)^2 + \left(\frac{\cot 20^\circ}{\sec 70^\circ}\right)^2 + 2 \tan 15^\circ \tan 37^\circ \tan 53^\circ \tan 60^\circ \tan 75^\circ$

- Q17. Find the value of $(\sin^4 \theta - \cos^4 \theta + 1) \operatorname{cosec}^2 \theta$
- Q18. Prove that: $(\sin \theta + \cos \theta)(\tan \theta + \cot \theta) = \sec \theta + \operatorname{cosec} \theta$.
- Q19. Find the mean of the following distribution:

Classes	0-20	20-40	40-60	60-80	80-100
Frequency	15	18	21	29	17

- Q20. Find the missing frequency 'f', if the mode of the given data is 154.
- | | | | | | | |
|----------------|---------|---------|---------|---------|---------|---------|
| Class Interval | 120-130 | 130-140 | 140-150 | 150-160 | 160-170 | 170-180 |
| Frequency | 2 | 8 | 12 | f | 8 | 7 |

$\frac{285}{470} = 246$

SECTION - D (4 MARKS EACH)

- Q21. Find all zeroes of the polynomial $x^4 - 11x^2 + 28$, if two of the zeroes are $\sqrt{7}$ and $-\sqrt{7}$.
- Q22. Solve the following pair of equations for x and y:
 $\frac{6}{x-1} - \frac{3}{y-2} = 1$
- $\frac{5}{x-1} + \frac{1}{y-2} = 2$, where $x \neq 1, y \neq 2$.

- Q23. Rohan, Shivam and Saurabh prepared cards for all the persons of an old age home. In order to complete one card, they take 10, 16 and 20 minutes respectively. If all of them started together, after what time will they complete a card together? Which values do these children possess?

Q24. A boat goes 30km upstream and 44km downstream in 10 hours. In 13 hours, it can go 40km upstream and 55km downstream. Determine the speed of the stream and that of the boat in still water.

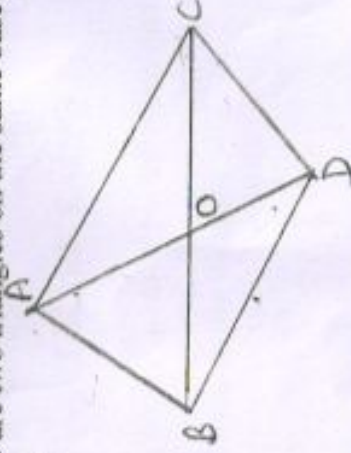
Q25. State and prove Pythagoras theorem.

Q26. Prove that:

$$(1 - \sin \theta + \cos \theta)^2 = 2(1 + \cos \theta)(1 - \sin \theta)$$

Q27. In the given figure, ABC and DBC are two triangles on the same base BC. If AD intersects

BC at O, show that $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DBC)} = \frac{AO}{DO}$



Q28. If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$ then prove that $x^2 + y^2 = 1$.

Q29. Prove that: $2 \sec^2 \theta - \sec^4 \theta - 2 \operatorname{cosec}^2 \theta + \operatorname{cosec}^4 \theta = \cot^4 \theta - \tan^4 \theta$.

Q30. Draw 'more than Ogive' for the following frequency distribution and hence obtain the median:

Class Interval	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	12	2	4	3	4	3

Q31. Find the missing frequencies 'x' and 'y' in the following frequency distribution table, if median is 28.5.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	x	20	15	y	5	60

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