CLASS : X 9/2012

SUBJECT : MATHEMATICS (SET-II)

Time : 3 Hrs. **M.M.: 90**

General Instructions :

1. ***All questions are compulsory.***
2. ***The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 8 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 10 questions of 4 marks each.***
3. ***Question numbers 1 to 8 in Section-A are multiple choice questions where you are required to select one option out of the given four.***
4. ***There is no overall choice. However, internal choices have been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one of the alternatives in all such questions.***
5. ***Use of calculator is not permitted.***

SECTION-A

Question numbers 1 to 8 carry one mark each. For each question, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

Q1. Decimal expansion of $\frac{23}{2^3 5^2}$ will be :

(a) terminating

(b) non-terminating

(c) non-terminating and repeating

(d) non-terminating and non-repeating

Q2. The polynomial whose zeroes are -5 and 4 is :

(a) $x^2 - 5x + 4$ (b) $x^2 + 5x - 4$

(c) $x^2 + x - 20$ (d) $x^2 - 9x - 20$

Q3. $\Delta DEF \sim \Delta ABC$; If DE : AB = 2:3 and ar (ΔDEF) is equal to 44 square units, then area (ΔABC) is square units is :

(a) 99 (b) 120

(c) $\frac{176}{9}$ (d) 66

Q4. $3\sin^2 20° - 2\tan^2 45° + 3\sin^2 70°$ is equal to :

(a) 0 (b) 1

(c) 2 (d) -1

Q5. L.C.M. of $2^3 \times 3^2$ and $2^2 \times 3^3$ is :

(a) 2^3 (b) 3^3

(c) $2^3 \times 3^3$ (d) $2^2 \times 3^2$

Q6. $x = 2$, $y = 3$ is a solution of the linear equation :

(a) $2x + 3y - 13 = 0$ (b) $3x + 2y - 31 = 0$

(c) $2x - 3y + 13 = 0$ (d) $2x + 3y + 13 = 0$

Q7. Given that $\sin\theta = \frac{a}{b}$, then $\tan\theta$ is equal to :

(a) $\frac{b}{\sqrt{a^2 + b^2}}$ (b) $\frac{b}{\sqrt{b^2 - a^2}}$

(c) $\frac{a}{\sqrt{a^2 - b^2}}$ (d) $\frac{a}{\sqrt{b^2 - a^2}}$

Q8. Relationship among mean, median and mode is :

(a) 3 Median = Mode + 2 Mean (b) 3 Mean = Median + 2 Mode

(c) 3 Mode = Mean + 2 Median (d) Mode = 3 Mean - 2 Median

SECTION-B

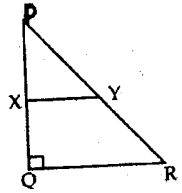
Question numbers 9 to 14 carry two marks each.

Q9. Using Euclid's algorithm, find the HCF of 240 and 228.

Q10. Find a quadratic polynomial whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$

Q11. If $\cos(A + B) = 0$ and $\sin(A - B) = \frac{1}{2}$, then find the values of A and B where A and B are acute angles.

Q12. In the given figure, PQR is a triangle right angled at Q and XY ∥ QR. If PQ = 6 cm, PY = 4 cm and PX : XQ = 1:2. Calculate the lengths of PR and QR.



Q13. Find the quadratic polynomial whose sum and product of the zeroes are $\frac{21}{8}$ and $\frac{5}{16}$ respectively.

Q14. Convert the following distribution to a 'more than type' cumulative frequency distribution.

Class :	10-20	20-30	30-40	40-50	50-60
Frequency :	4	8	10	12	10

OR

Find the mode of the following frequency distribution :

Class :	0-10	10-20	20-30	30-40	40-50
Frequency :	3	8	9	10	3

SECTION-C

Question numbers 15 to 24 carry three marks each.

Q15. D, E, F are respectively the mid-points of the sides AB, BC and CA of ΔABC. Find the ratios of the areas of ΔDEF and ΔABC.

Q16. Find the zeroes of the following quadratic polynomial and verify the relationship between the zeroes and the co-efficients $2x^2 - 3 + 5x$.

Q17. Find the HCF and LCM of 336 and 54 and verify that LCM × HCF = Product of two numbers.

OR

Prove that $\sqrt{5}$ is irrational and hence show that $3 + \sqrt{5}$ is also irrational.

Q18. Prove that : $\frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A}$

Q19. Find all the zeroes of $x^3 + 11x^2 + 23x - 35$, if two of its zeroes are 1 and -5.

Q20. For which value of k will the following pair of linear equations have no solution?

$3x + y = 1$, $(2k - 1)x + (k - 1)y = 2k + 1$

OR

Find whether the following pair of linear equations have a unique solution. If yes, find the solution :

$7x - 4y = 49$; $5x - 6y = 57$

Q21. The following is the distribution of heights of students of a class in a school

Height (in cm)	160-163	163-166	166-169	169-172	172-175
No. of Students	15	118	142	127	18

Find the median height.

Q22. Diagonals of a trapezium ABCD with AB || CD intersect each other at the point O. If AB = 2CD, find the ratio of the area of triangles AOB and COD.

OR

Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

Q23. Evaluate : $\frac{\sec^2(90°-\theta) - \cot^2\theta}{2(\sin^2 25° + \sin^2 65°)} + \frac{2\cos^2 60° \tan^2 28° \tan^2 62°}{3(\sec^2 43° - \cot^2 47°)}$

Q24. Find the mean for the following data :

Classes	Frequencies
25 - 35	7
35 - 45	31
45 - 55	33
55 - 65	17
65 - 75	11
75 - 85	1

SECTION-D

Question numbers 25 to 34 carry four marks each.

Q25. Use Euclids Division Lemma to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

Q26. Check graphically, whether the pair of equations $x + 3y = 6$; $2x - 3y = 12$ is consistent. If so, then solve them graphically.

Q27. Prove that : $\frac{\text{Cosec A}}{\text{Cosec A} - 1} + \frac{\text{Cosec A}}{\text{Cosec A} + 1} = 2\,\text{Sec}^2\text{A}$

Q28. Find the missing frequencies f_1 and f_2 in the following frequency distribution table, if N = 100 and median is 32.

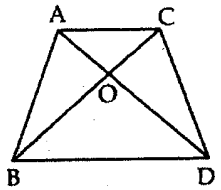
Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	10	f_1	25	30	f_2	10	100

Q29. Divide $p(x) = 3x^5 - 2x^4 + x^2 - 2$ by $g(x) = x^2 + x + 1$ and check the result by division algorithm.

OR

The age of the father is twice the sum of the ages of his 2 children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

Q30. In the given figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\frac{ar(\Delta ABC)}{ar(\Delta DBC)} = \frac{AO}{DO}$



OR

If the areas of two similar triangles are equal, prove that they are congruent.

Q31. Evaluate : $\frac{\cot(90°-\theta)\sin(90°-\theta)}{\sin\theta} + \frac{\cot 40°}{\tan 50°} - (\cos^2 20° + \cos^2 70°)$

Q32. Prove that the ratio of the area of two similar triangles is equal to the ratio of the squares of their corresponding sides.

Q33. Prove that : $\frac{\cos\theta}{1 - \tan\theta} + \frac{\sin\theta}{1 - \cot\theta} = (\cos\theta + \sin\theta)$

Q34. For the following frequency distribution, draw a cumulative frequency curve of less than type.

Class	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600
Frequency	30	15	45	20	25	40	10	15