

JP INTERNATIONAL SCHOOL
3A, SECTOR OMEGA-1, GREATER NOIDA

SUBJECT : MATHS
I SEMESTER EXAMINATION 2017-18

CLASS X

Time: 3 hours

Subject: Mathematics (041)

M. M. 80

Date: - 20/9/2017

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper contains 30 questions.
- (iii) Question 1- 6 in Section A are very short-answer type questions carrying 1 mark each.
- (iv) Question 7-12 in Section B are short-answer type questions carrying 2 marks each.
- (v) Question 13-22 in Section C are long-answer-I type questions carrying 3 marks each.
- (vi) Question 23-30 in Section D are long-answer-II type questions carrying 4 marks each.

Section A (1X 6 =6)

1. Given that $HCF(306,657) = 9$, find $LCM(306,657)$.
2. Find the quadratic polynomial if sum and product of its zeroes are 4,1 respectively.
3. On comparing the ratios $a_1/a_2, b_1/b_2, c_1/c_2$, find out whether the given equation is consistent, or inconsistent
 $5x - 3y = 11$
 $-10x + 6y = -21$
4. Write the formula of Mode and Median of a grouped data.
5. In a triangle ABC, right angled at B, $AB=24$ cm, $BC= 7$ cm, Determine $\sin A$.
6. If $\tan A = \cot B$, prove that $A + B = 90^\circ$

Section B (2X 6 =12)

7. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite number.
8. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = 1/\sqrt{3}$; $0 < A + B <= 90$; $A > B$, find A and B.
9. Find the mode of the following data:

Lifetimes	0-20	20-40	40-60	60-80	80-100	100-120
F	10	35	52	61	38	29

10. Find the mean of the following table:

c. i.	0-2	2-4	4-6	6-8	8-10	10-12	12-14
F	1	2	1	5	6	2	3

11. Solve $2x + 3y = 5$
 $7x - y = 6$ using substitution method.
12. Divide $3x^2 - x^3 - 3x + 5$ by $x - 1 - x^2$

Section C (3 X 10 =30)

13. Use Euclid's division lemma to show that the square of any positive integer is either of the form $3m$ or $3m + 1$ for some integer m .
14. Obtain all other zeroes $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.
15. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.
16. Prove that $\sqrt{3} + 5$ is an irrational number.
17. Prove that: $(\sin A + \operatorname{Cosec} A)^2 + (\cos A + \operatorname{Sec} A)^2 = 7 + \tan^2 A + \cot^2 A$
18. If $8 \cot x = 7$, then Evaluate $\frac{(1 + \sin x)(1 - \sin x)}{(1 + \cos x)(1 - \cos x)}$
19. Find the value of x and y , if the median of the given data is 28.5

INTERVAL	0-10	10-20	20-30	30-40	40-50	50-60	Total
F	5	X	20	15	Y	5	60

20. Find the mean of the following data

C.I.	0-10	10-20	20-30	30-40	40-50	50-60	Total
F	15	2	8	15	3	7	50

21. A kite is flying at a height of 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string. Assuming that there is no slack in the string.
22. For what value of a and b does the following pair linear equations have infinite number of solutions?
 $2x + 3y = 7$
 $(a-b)x + (a+b)y = 3a + b - 2$

Section D (4 X 8 =32)

23. Using Euclid's division Lemma find HCF of 4052 and 12576.

24. $\frac{\tan x}{1 - \cot x} + \frac{\cot x}{1 - \tan x} = 1 + \sec x \operatorname{cosec} x$

25. State whether the following are true or false. Justify your answer.

- The value of $\tan A$ is always less than 1.
- $\sec A = 12/5$ for some value of angle A .
- $\cot A$ is the product of \cot and A .
- $\sin A = 5/4$ for some angle A .

26. Draw the graphs of the equations $5x-y=5$ and $3x-y=3$. Determine the co-ordinate of the vertices of the triangle formed by these lines and y-axis.
27. Divide $x^5-4x^3+x^2+3x+1$ by x^3-3x+1 . And find quotient and remainder.
28. The angle of depression of the top and bottom of a 8 m tall building from the top of a multi-storage building are 30 and 45, respectively. Find the height of the multi-storage building and the distance between the two buildings.
29. If a line is drawn parallel to one side of a triangle is intersect the other two sides in distinct points, the other two sides are divided in the same ratio.
30. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg/ hec)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

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