Amity (PV)

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First Term Exam – 2017-2018

Class – X

Subject – MATHEMATICS

Time : 3 Hours **Max. Marks : 80**

General Instructions:

(i) All questions are compulsory.

(ii) This question paper consists of 30 questions divided into 4 sections - A, B, C and D.

(iii) Section A contains 6 questions of 1 mark each.

Section B contains 6 questions of 2 marks each.

Section C contains 10 questions of 3 marks each.

Section D contains 8 questions of 4 marks each.

(iv) There is no overall choice.

(v) Use of calculator is not permitted.

SECTION – A

1. Given that HCF (306, 657) = 9, Find LCM (306, 657).

2. If $\Delta ABC \sim \Delta DEF$, BC = 3 EF and area(ΔABC) = 117 cm^2, then Find the area (Δ DEF).

3. If 24 cot A = 7, Find the value of sin A.

4. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

5. For what value of k will $k + 9$, $2k$-1 and $2k$+7 are the consecutive terms of an AP?

6. Which constant should be added and subtracted to solve the quadratic equation $2x^2 - 5x + 3 = 0$ by the method of completing the square.

SECTION – B

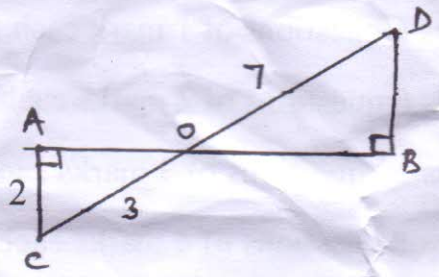
7. If HCF of 144 and 180 is expressed in the form 13m – 3, find the value of m.

8. For what values of k will the following pair of linear equations have infinitely many solutions?

$K\,x+3\,y-(k-3)=0$

$12x+k\,y-k=0$

9. In the figure if AC= 2m, OC = 3m and OD=7m, Find BD.



10. Find the acute angle θ, satisfying the equation $\sec^2\theta + \tan^2\theta = 3$.

11. The tops of two towers of height x and y, standing on level ground , subtends angle of 30° and 60° respectively at the centre of the line joining their feet, then find $x : y$.

12. If -5 is a root of quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2+x) + k=0$ has equal roots, find the value of k.

SECTION – C

13. Prove that $\sqrt{3}$ is irrational.

14. Find the zeroes of the quadratic polynomial $4u^2 + 8u$ and verify the relationship between the zeroes and the coefficients.

15. Solve for x and y :

$$\frac{2}{x-1} - \frac{1}{y-1} = 4$$

$$\frac{4}{x-1} - \frac{1}{y-1} = 10$$

16. "In a triangle, if square of one side is equal to the sum of squares of other two sides, then the angle opposite to the first side is a right angle". Prove the converse of the above statement.

17. Evaluate : $\text{cosec } 39° . \cos 51° + \tan 21° \cot 69° - \sec^2 21°$

18. The probability of selecting a red ball at random from a jar that contains red, blue and orange balls is ¼. The probability of selecting a blue ball at random from the same jar is 1/3. If the jar contains 10 orange balls, Find the total number of balls in the jar.

19. Prove that : $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

20. Solve : $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, $a+b \neq 0$.

21. The 14^{th} term of an A.P. is twice its 8^{th} term. If its 6^{th} term is -8, then find the sum of its first 20 terms.

22. A survey conducted on 20 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household.

Family size	1-3	3-5	5-7	7-9	9-11
Number of families	7	8	2	2	1

Find the mode of this data.

SECTION - D

23. 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.

24. Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$

25. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$.

26. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6km/hr more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed.

27. A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60°. From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower and the width of the canal.

28. Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

29. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees , that each section of each class will plant , will be the same as the class , in which they are studying, eg a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What is the value depicted by the students?

30. During the medical check-up of 35 students of a class, their weights were recorded as follows :

Weight (in kg)	**Number of students**
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type ogive for the given data. Hence obtain the median weight from the graph and verify by using the formula.