مدرسة دلهي الخاصة ذ.م.م.
DELHI PRIVATE SCHOOL L.L.C.
Affiliated to C.B.S.E., DELHI
(Approved & Recognized By Ministry of Education - United Arab Emirates)
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FT/MAQP/1121/A **29-SEP-2021**

FIRST TERM EXAMINATION (2021-22)

Subject: MATHEMATICS **Max. Marks:40**

Grade: XI **Time:90 Minutes**

Name: **Section:** **Roll No:**

General Instructions:

1. This question paper contains three sections – A, B and C. Each part is compulsory.
2. Section - A has 20 MCQs, attempt any 16 out of 20.
3. Section - B has 20 MCQs, attempt any 16 out of 20
4. Section - C has 10 MCQs, attempt any 8 out of 10.
5. There is no negative marking.
6. All questions carry equal marks.

SECTION – A

In this section, attempt any 16 questions out of Questions 1 – 20.

Each Question is of 1 mark weightage

1. The AM and GM between two positive numbers a and b are equal. Then

a. $a = \frac{1}{b}$ **b.** $b = \frac{1}{a^2}$

c. $a = \frac{1}{b^2}$ **d.** None of these

2. Let n(A)=2 and n(B)=2. the number of non-empty relation from A to B becomes

a. 4 **b.** 16

c. 15 **d.** None of these

3. The range of the function $f(x)=\frac{x}{|x|}$ is

a. **R- {0}** **b.** **R- {-1,1}**

c. **{-1,1}** **d.** None of these

4. If A and B are finite sets such that $A \subset B$, then $n(A \cup B)$ = _____.

a. ∅ **b.** n (A)

c. n(B) **d.** U

5. The range of the function $f(x)=|x-1|$ is

a. **$(-\infty, 0)$** **b.** **$[0, \infty)$**

c. **$(0, \infty)$** **d.** R

6. The domain and the range of the function f given by $f(x)=2-|x-5|$ is

a $D = R^+ \text{ and } R = (-\infty, 2)$ **b** $D = R^- \text{ and } R = (-\infty, 2)$

c $D = R \text{ and } R = (-\infty, 2)$ **d** $D = R \text{ and } R = (-\infty, 2]$

7. If Set A and B are defined as $A=\left\{(x,y): y=\frac{1}{x}, 0 \neq x \epsilon R\right\}$ and $B=\{(x,y): y=x, x \epsilon R\}$, $then\ n(A \cap B)$= _

a 2 **B** 0

c 1 **d** None of these

8 If $Z_1$and Z_2 are any two complex numbers such that $Z_1 + Z_2$ is real, then

a $z_1 = \bar{z_1}$ and $z_2 = \bar{z_2}$ **b** $z_1 = \bar{z_2}$

c $z_1 = \frac{1}{z_2}$ **d** None of these

9. If $z=\frac{3+i2}{3-i2}$ $then\ |z|$ = ____

a 5 **b** $\sqrt{\frac{13}{5}}$

c $\sqrt{\frac{5}{13}}$ **d** None of these

10. If $z=\frac{1}{1+i^{50}+i^{100}+i^{501}}$ $then\ |z|$= ___

a 1 **b** 0

c $\frac{1}{\sqrt{2}}$ **d** None of these

11. The smallest positive integer for which $\left(\frac{1+i}{1-i}\right)^n = 1\ , is$ ____

a 2 **b** 3

c 4 **d** 6

12. If 'n' is a positive integer the value of $i^n + i^{n+1} + i^{n+2} + i^{n+3}$ is

a 0 **b** 1

c -1 **d** -i

13. $\left(\frac{1-i}{1+i}\right)^2$ =_____

a 1 **b** -1

c I **d** None of these

14. The value of $9^{\frac{1}{3}}.9^{\frac{1}{9}}.9^{\frac{1}{27}}. \ldots \ldots \ldots . to\ \infty\ is$ ___

a 3 **b** 6

c 2 **d** None of these

15. Which term of the sequence $\sqrt{3}, 3, 3\sqrt{3}, \ldots\ldots, is\ 729$

a 12 **b** 6

c 3 **d** None of these

16, If three GMs are inserted between 3 and 243, the common ratio is_____

a 6 **b** 4

c 3 **d** None of these

17. If the first term of a GP is 2 and the sum to infinity is 6, then the common ratio is _____

a 3 **b** $\frac{1}{3}$

c $\frac{2}{3}$ **d** 2

18. The common ratio of a GP is 3, and its 7^{th} term is 243, then its third term is _____

a 1 **b** 9

c 3 **d** 27

19. Arithmetic means are inserted between 7 and 71 in such a way that its 5^{th} mean is 27. Then the common difference is ____

a	5	**b**	4
c	6	**d**	None of these

20. If the sum of n terms of an AP is given $S_n=3n+2n^2$, then the common difference is _____

a	14	**b**	9
c	4	**d**	5

SECTION B

In this section, attempt any 16 questions out of Questions 21 – 40.

Each Question is of 1 mark weightage.

21. If n arithmetic means are inserted between 3 and 17 such that the last is 3 times the first, then n = _____

a.	5	**b.**	6
c.	9	**d.**	8

22. If n AM" s are inserted between x and 2y and also between 2x and y. If the r^{th} means are equal, then

a.	x=y	**b.**	ny=rx
c.	ry=(n-r+1)x	**d.**	ry= (n-r)x

23. In a locality of 2000 families, it was found that 40% of families buy newspaper A, 20% buy newspaper B and 10% families buy newspaper C,5% buy A and B ,3% buy B and C and 4 % buy A and C. If 2% buy all the 3 newspapers, the number of families which buy A only is _____

a.	310	**b.**	660
c.	360	**d.**	730

24. If the sum to infinity of a GP is 2 and the sum to infinity of the squares of the terms is also 2, then the common ratio is

a.	$\frac{1}{2}$	**b.**	$\frac{1}{3}$
c.	$\frac{1}{4}$	**d.**	$-\frac{1}{2}$

25. If p, q, r are in AP and x,y,z form a GP then $x^{q-r}.y^{r-p}.z^{p-q} =$ ___

a	x. y. z	**b**	x +y + z
c	p. q. r	**d**	1

26. The multiplicative inverse of the complex number $\frac{3-i}{1+2i}+\frac{1+i}{2-i}$ is _____

a	3+i2	**b**	2+i2
c	$\frac{2+i}{2}$	**d**	$\frac{1+2i}{2}$

27. The second, third and the 6^{th} term of an AP are consecutive terms of a GP. Then the common ratio of the GP is _____

a	1	**b**	2
c	3	**d**	-1

28. $\frac{z+2}{z-2}$ is purely imaginary, then $|z|$ =_____

a	1	**b**	2
c	3	**d**	$5/2$

29. If f(z)=$\frac{7-z}{1-z^2}, where\ z=1+2i, then\ |f(z)|\ is$ _____

a $\frac{|z|}{2}$ **b** $|z|$

c $2|z|$ **d** None of these

30. Two finite set have 'm' and 'n' elements. The number of elements in the power set of the first set is 48 more than the total number of elements in power set of the second set. Then the value of m and n are

a m=6 , n= 5 **b** m=7 , n=4

c m = 6 , n = 4 **d** m = 2, n=4

31. X=$\{4^n - 3n - 1 : n \in N\}$; $Y = \{9(n-1) : n \in N\}$ then XUY=___

a X **b** Y

c N **d** None of these

32. The sum of the first two terms of an infinite GP is 1 and every term is equal to twice the sum of the succeeding terms. The first term of the GP is

a ½ **b** ¼

c 2/3 **d** ¾

33. A GP consists of an even number of terms. If the sum of all the terms is 5 times the sum of terms in the odd places, the common ratio of the GP is

a 4 **b** 5

c 3 **d** 5/2

34. If $(x+iy)^{\frac{1}{3}} = a + ib$, then $\frac{x}{a} + \frac{y}{b} =$ _

a $a^2 + b^2$ **b** $2(a^2 - b^2)$

c $2(a^2 + b^2)$ **d** $4(a^2 - b^2)$

35. The value of $\left(\frac{1-i}{1+i}\right)^{100}$ *is* _____

a i **b** -i

c 0 **d** 1

36. The complex number z= x + i y which satisfies the equation $\left|\frac{z-i2}{z+i2}\right| = 1$ lies on

a The real axis **b** Imaginary axis

c The straight-line x=1 **d** The line y=1

37. Find the range of the function f(x)= $\frac{3}{2-x^2}$

a $(-\infty, 0) \cup \left(\frac{3}{2}.0\right)$ **b** R-$[0, \frac{3}{2})$

c $(0, \frac{3}{2})$ **d** $(-\frac{3}{2}, \frac{3}{2})$

38. The domain of the function f defined by f(x)=$\sqrt{4-x} + \frac{1}{\sqrt{x^2-1}}$

a $(-\infty, -1) \cup [1,4)$ **b** $(-\infty, -1) \cup (1,4)$

c $(-\infty, -1) \cup (1,4]$ **d** $(-\infty, 1] \cup [1,4)$

39. If f(x)= a x+ b where a and b are integers and f(-1)= -5 and f(3)=3. Then the value of a + b = ___

a 5 **b** -5

c -1 **d** 3

40 a and b are real numbers such that $\frac{a}{1+i} + \frac{b}{1+2i} + 1 = 0$, $then\ |a+ib|$ is

a $\sqrt{34}$ **b** $\sqrt{50}$

c $\sqrt{41}$ **d** $\sqrt{40}$

SECTION – C

In this section, attempt any 8 questions.
Each question is of 1-mark weightage.
Questions 46-50 are based on a Case-Study.

41 If n is even $\frac{1+i^{2n+1}}{1+i^{2n-1}}$ = _____

a	1	**b**	-1
c	i	**d**	-i

42. The conjugate of $\frac{1}{i^7}$

a	1	**b**	-i
c	i	**d**	None of these

43. The domain of the function f(x)=$\sqrt{x-1}+\sqrt{3-x}$

a	**[1,∞)**	**b**	**(-∞, 3)**
c	**(1,3)**	**d**	**[1,3]**

44 The domain of the function f(x) given by f(x)=$\frac{x^2+2x+1}{x^2-x-6}$

a	R- {3, -2}	**b**	R-(3, -2)
c	R- [-3, -2]	**d**	-1

45. The range of the function defined by f(x)= $\frac{4-x}{4+x}$

a	-4	**b**	-1
c	1	**d**	None of these

In a survey of 25 students, it was found that 15 had taken Mathematics,12 had taken Physics and 11 had taken Chemistry ,5 had taken Mathematics and Chemistry ,9 had taken Mathematics and Physics, 4 had taken Physics and Chemistry and 3 had taken all the three subjects. Find the number of students that had taken in the following question (Qu Nos:46-50)

46 How many students taken Mathematics alone

a	4	**b**	5
c	2	**d**	1

47. Number of students who has not choose any of the subjects

a	0	**b**	2
c	3	**d**	1

48. Number of students who has taken only one subjects

a	10	**b**	8
c	11	**d**	5

49. Number of students who have taken atleast one of the three subjects

a 9 **b** 25

c 23 **d** 15

50. Number of students who has taken any of the two subjects

a 11 **b** 7

c 6 **d** 9

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