# BUDHA DAL PUBLIC SCHOOL PATIALA

FIRST TERM EXAMINATION(September 2025)

Class - XI

Paper- Mathematics (Set-B)

M.M. 80

**Time: 3hrs.**

**General Instructions:**

1. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer type questions of 2 marks each.
4. Section C has 6 Short Answer type questions of 3 marks each.
5. Section D has 4 Long Answer type questions of 5 marks each.
6. Section E has 3 case based studies of 4 marks each.

## Section - A

1. Let Set $A = \{2, 4, 6, 8\}, B = \{2, 2, 4, 6, 8, 6\}$ then sets A and B are

   a) Equal sets  b) Unequal sets  c) (a) and (b) both  d) None of these

2. A set which is subset of every set is

   a) Null set  b) Universal set  c) Singleton set  d) None of these

3. Given set $A = \{a, b\}, B = \{1, 2\}$. How many relations are possible from set A to set B?

   a) 2  b) 4  c) 16  d) 8

4. Given relation $R = \{(5, 6), (7, 9), (5, 9), (5, 10)\}$ then range of the relation contains

   a) 2 elements  b) 4 elements  c) 3 elements  d) 1 element

5. If $z_1 = a + ib$ *and* $z_2 = C + id$ are two complex numbers. Then product $z_1 z_2$ is defined as

   a) $ac + bd$  b) $ac + ibd$  c) $(ac - bd) + i(ad + bc)$  d) none of these

6. Conjugate of $Z = i^3 - 4$ is

   a) $i^3 + 4$  b) $4 - i$  c) $-4 + i$  d) $-4 - i$

7. If $|x - 1| > 5$ then

   a) $x \in (-4,6)$  b) $x \in [-4, 6]$  c) $x \in [-\infty, -4) \cup [6, \infty)$  d) $x \in (-\infty, -4) \cup (6, \infty)$

8. Solution of a linear inequality in variable $x$ is represented on number line as


   Solution is

   a) $[2, \infty)$  b) $[2, \infty]$  c) $[-\infty, 2]$  d) $[-\infty, 2)$

A-1

9. Solution of $11x < 101, x \in Z$ is

a) $\left(-\infty, \frac{101}{11}\right)$ b) $\left(-\infty, \frac{101}{11}\right)$ c) $\{\ldots, -4, -3, -2, -1, 0, 2, \ldots 9\}$ d) $\{1, 2, 3, \ldots \ldots, 9\}$

10. If ${}^{n}C_{12} = {}^{n}C_{8}$, $n$ is equal to

a) 20 b) 12 c) 6 d) 30

11. The number of ways in which 5 students can sit on a bench are

a) 120 b) 20 c) 100 d) 240

12. How many words (with or without meaning) can be formed from the letters of the word 'AGAIN'

a) 120 b) 60 c) 30 d) 15

13. Number of terms in the expansion of $(x - 2y)^{10}$ are

a) 10 b) 12 c) 20 d) 11

14. Binomial coefficient of $8^{th}$ term in the expansion of $(a + b)^8$ is

a) ${}^{8}C_{8}$ b) ${}^{8}C_{6}$ c) ${}^{8}C_{7}$ d) ${}^{8}C_{5}$

15. The $n^{th}$ term of a G.P. $1, 0.1, 0.01, 0.001, \ldots$ is

a) $(0.1)^n$ b) $(0.01)^n$ c) $(0.1)^{n-1}$ d) $(0.01)^{n-1}$

16. Given G.P. $1, 0.12, 0.0144, \ldots\ldots$ the common ratio is

a) 1 b) 12 c) 1.2 d) 0.12

17. If three numbers $x, y, z$ are in G.P. then

a) $\sqrt{xy} = z$ b) $\sqrt{xz} = y$ c) $\sqrt{yz} = x$ d) $x + z = 2y$

18. Variance is denoted by

a) $\frac{\sigma}{n}$ b) $\sqrt{\sigma}$ c) $\sigma^2$ d) $\sigma$

**Assertion & Reasoning Questions**

The following questions consists of two statements – Assertion (A) and Reason (R). Answer the question selecting appropriate option given below:

a) Both A and R are true and R is correct explanation for R.
b) Both A and R are true but R is not correct explanation for R.
c) A is true but R is false.
d) A is false but R is true.

19. Assertion (A) 'Set of difficult topic in Physics' is a well defined set.
Reason (R) : A collection of object which is well defined is called a set.

20. Assertion (A) : Total number of terms in the expansion of $\left(x-\frac{5}{x}\right)^6$ is 5.
Reason (R) : Total number of terms in the expansion of $(a+b)^n$ are $(n+1)$

## Section – B

21. If $U=\{1,2,3,4,5,6,7,8,9\}$, $B=\{2,4,6,8\}, B=\{2,3,5,7\}$ verify that $(A\cup B)'=A'\cap B'$

22. If $P=\{1,2\}$, find $P\times P\times P$

23. Let $z_1=2-i$ *and* $z_2=-2+i$ then find $Re\left[\frac{z_1 z_2}{\bar{z}_1}\right]$

24. Using Binomial Theorem evaluate $(96)^3$

25. Solve $\frac{3x-4}{2}\geq\frac{x+1}{4}-1$. Show the graph of solutions on number line.

## Section – C

26. Find $f(x)=\begin{cases}1+x, & -1\leq x<0\\ x^2, & 0<x<2\\ 2x, & 2\leq x\end{cases}$, then find $f(3), f(1), f\left(-\frac{1}{2}\right)$, check whether it is relation or function.

27. Find multiplicative inverse of $\left(3+\sqrt{2}i\right)^2$

28. Expand $\left(\frac{x}{3}+\frac{1}{x}\right)^4$, using binomial theorem

29. The sum of first three terms of a G.P. is 16 and sum of next three terms is 128. Determine the first term, the common ratio and the sum to $n$ terms of the G.P.

30. If $x+iy=\frac{(a^2+1)^2}{2a-i}$, What is the value of $x^2+y^2$ ?

31. Calculate the mean deviation about median for the following marks:

| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|---|---|---|---|---|---|---|
| Frequency | 6 | 7 | 15 | 16 | 4 | 2 |

## Section – D

32. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many ways of these?
a) are face cards
b) four cards of same suit
c) cards are of same colour
d) two are red cards and two are black cards

33. How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

34. Find the sum of series $\frac{3}{5}+\frac{4}{5^2}+\frac{3}{5^3}+\frac{4}{5^4}+$ ..... $+2n$ terms

35. Calculate the mean, variance and standard variation of following data:

| Wages (in Rs.) | 0-15 | 15-30 | 30-45 | 45-60 | 60-75 | 75-90 | 90-105 | 105-120 |
|---|---|---|---|---|---|---|---|---|
| No. of workers | 12 | 18 | 35 | 42 | 50 | 45 | 20 | 8 |

## Section – E

**Case Study Questions**

36. Aarti explained operations on sets to her younger sister 'Pooja' then wrote three sets as $A = \{2, 3, 6, 7\}, B = \{4, 5\}, C = \{x: x \text{ is a prime nuber less than } 9\}$ She asked her sister that the following questions will judge how much you have solve and write down answer.

**Based on the above information, answer the following questions :**

1. $(B \cup C)$ (1)
2. $(A \cup B) \cap C$ (1)
3. Verify that $A \cap (B \cup C) = (A \cap B) \cup (A \cup C)$ (2)

37. In how many ways can the letters of the word 'PERMUTATIONS' be arranged? (1)

**Based on above information, answer these following questions:**

1. words start with P and end with S. (1)
2. vowels are all together (2)

38. One side of an equilateral triangle is 72 cm. The midpoints of its sides are joined to form second triangle whose midpoints, in turn are joined to form third triangle. The process is continued to form a G.P.

**Based on above information, answer these following questions:**

1. Find side of 4th triangle. (1)
2. Find sum of perimeters of first four triangles using formula of G.P. (2)
3. Find area of 5th triangle. (1)