

BUDHA DAL PUBLIC SCHOOL, PATIALA

FINAL EXAMINATION (10 March 2026)

Class : XI

Subject : Mathematics (041) (Set-B)

MM: 80

Time: 3hrs.

General Instructions :

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory.
2. Section A has 20 MCQ's questions of 1 mark each.
3. Section B has 5 questions of 2 marks each.
4. Section C has 6 questions of 3 marks each.
5. Section D has 4 questions of 5 marks each.
6. Section E has 3 case based questions of 4 marks each.

Section - A

- Q1. If $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{1, 5, 9\}$ then $A - B$ is
a) $\{1, 2, 4\}$ b) $\{5, 6\}$ c) $\{2, 3, 4, 6\}$ d) $\{2, 3, 7, 8\}$
- Q2. If $f(x) = ax + b$, where a, b are integers, $f(-1) = -5$ and $f(3) = 3$ then
a) $a = -3, b = -1$ b) $a = 2, b = -3$ c) $a = 0, b = +2$ d) $a = 2, b = 3$
- Q3. The Value of $\tan \frac{\pi}{12}$ is
a) $2 + \sqrt{3}$ b) $\sqrt{3}$ c) $2 - \sqrt{3}$ d) 2
- Q4. The number of subsets of a set containing n elements is
a) n b) 2^{n-1} c) n^2 d) 2^n
- Q5. If $A = \{x: x^2 - 5x + 6 = 0\}$, $B = \{2, 4\}$, $C = \{4, 5\}$ then $A \times (B \cap C)$ is
a) $\{(2, 4)(3, 4)\}$ b) $\{(4, 2), (4, 3)\}$ c) $\{(2, 4), (3, 4), (4, 4)\}$ d) $\{(2, 2), (3, 3), (4, 4), (5, 5)\}$
- Q6. If $\sin x + \cos x = 1$, then value of $\sin 2x$ is
a) 1 b) $\frac{1}{2}$ c) 0 d) -1
- Q7. If $x, y \in R$ then $x + iy$ is a non real complex number if
a) $x = 0$ b) $y = 0$ c) $x \neq 0$ d) $y \neq 0$
- Q8. The value of $(1 + i)(1 + i^2)(1 + i^3)(1 + i^4)$ is
a) 2 b) 0 c) 1 d) i
- Q9. If $a = 1 + i$ then a^2 equals
a) $1 - i$ b) $2i$ c) $(1 + i)(1 - i)$ d) $(i - 1)$
- Q10. The solution set of the inequation $|5 - 2x| \leq 3$ is
a) $(1, 4)$ b) $[1, 4]$ c) $(-\infty, 1)$ d) $(4, \infty)$
c) $x \in (-\infty, -4) \cup (6, \infty)$ d) $x \in [-\infty, -4] \cup [6, \infty)$
- Q11. If $x < 7$ then
a) $-x < -7$ b) $-x \leq -7$ c) $-x > -7$ d) $-x \geq -7$

B-1



- Q12. The number of different four digit numbers that can be formed with the digits 2, 1 and using each digit only once is
a) 120 b) 96 c) 24 d) 100
- Q13. In how many ways a committee consisting of 3 men and 2 women can be chosen from men and 5 women
a) 45 b) 350 c) 4200 d) 230
- Q14. The number of terms in the expansion of $(x - 2y)^{10}$ are
a) 10 b) 12 c) 20 d) 11
- Q15. Slope of a given line is $-\frac{1}{5}$. Slope of a line perpendicular to the given line is
a) $-\frac{1}{5}$ b) $\frac{1}{5}$ c) 5 d) -5
- Q16. Distance of point $(-1, 3)$ from the line $3x + 4y - 1 = 0$ is
a) $\frac{8}{5}$ units b) $-\frac{8}{5}$ units c) $\frac{6}{5}$ units d) $-\frac{6}{5}$ units
- Q17. $\lim_{x \rightarrow -1} [x^3 - x^2 + 1]$ is equal to
a) 0 b) 1 c) -1 d) 2
- Q18. Co-ordinate plane divide the space into _____ octants.
a) 4 b) 8 c) 12 d) 16

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

Q19. Assertion (A) : G.M. between 0.008 and 0.2 is 0.04

Reason (R) : If x, y, z are in G.P. then $y = \sqrt{xz}$

Q20. Assertion (A): For the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ co-ordinates of vertices are $(\pm 3, 0)$

Reason (R) = For the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ($a > b$) co-ordinates of vertices are $(\pm a, 0)$

Section - B

- Q21. Write all subsets of the set $A = \{a, b, c\}$
- Q22. Find the domain of the function $f(x) = \frac{x^2+2x+1}{x^2-8x+12}$
- Q23. Find the radius of the circle in which a central angle of $\frac{\pi}{3}$ intercepts an arc of length 37.4cm. ($\pi = \frac{22}{7}$)
- Q24. Express $\frac{5+\sqrt{2}i}{1-\sqrt{2}i}$ in the $(a + ib)$ form

B-2

Q25. Expand $\left(\frac{x}{3} + \frac{1}{x}\right)^5$ by binomial theorem

Section – C

Q26. If $U = \{1, 2, 3, 4, 5, 6\}$ $A = \{2, 3\}$ $B = \{3, 4, 5\}$ show that $(A \cup B) = A' \cap B'$

Q27. Prove that $\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$

Q28. How many words, with or without meaning can be made from the letters of the word MONDAY assuming that no letter is repeated if

- 4 letters are used at a time
- All letters are used at a time
- All letters are used but first letter is a vowel?

Q29. Find the co-ordinates of the foci, the vertices, the length of major axis, the eccentricity and the latus rectum of ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$

Q30. Find the derivative of $x^{-2} (6 + 7x^{-5})$

Q31. Three coins are tossed once. Find the probability of getting

- 3 heads
- 2 heads
- atleast 2 heads
- no head
- 3 tails
- atmost 2 tails

Section – D

Q32. Find value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, $\tan \frac{x}{2}$ If $\tan x = -\frac{4}{3}$, x lies quadrant II

Q33. The sum of first three terms of G.P is 16 and the sum of next three terms is 128. Determine the first term, the common ratio and the sum to n terms of the G.P.

Q34. In the triangle ABC with vertices A (2, 3), B (4, -1) and C (1, 2). Find the equation and length of altitude from the vertex A.

Q35. Find mean and variance for the following:

Classes	0-30	30-60	60-90	90-120	120-150	150-180	180-210
Frequency	2	3	5	10	3	5	2

Section – E

Case Study based questions:

Q36. Read the following information carefully and answer the questions given below:

To demonstrate the compound angle formulas in Trigonometry, Teena and Meena selected two angles A and B. Such that $A, B \in \left(0, \frac{\pi}{2}\right)$ and $\sin A = \frac{3}{5}$ $\cos B = \frac{9}{41}$

Answer the following based on above information

- Evaluate $\sin 2A$ (1)
- Evaluate $\sin B \cos A + \cos B \sin A$ (1)
- Evaluate $\cot (A + B)$ (2)

B-3

Q37. Read the following information carefully and answer the questions given below:

Four friends decide to play a game of cards. They picked a normal deck of 52 playing cards. The deck has 4 suits (Hearts, diamond, spade and club). Hearts and diamonds are red in colour, while spades and clubs are black in colour. Each suit has 13 cards each with one Ace (A), 9 numbered cards (2 to 10) and three face cards (Jack (J), King (K), Queen (Q))

Answer the following questions based on above information.

- i) In how many of these four cards are of same suit? (2)
- ii) In how many ways can four cards be drawn from the deck? (1)
- iii) In how many of these two are black cards and two are red cards? (1)

Q38. Suppose f is real valued function, the derivative of $f(x)$ is denoted by $f'(x)$ and by first principle method given by $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

Also, we have u and v as two functions in variable and $u' = \frac{du}{dx}$, $v' = \frac{dv}{dx}$, then derivative of their product and quotient is as follows

If $y = uv$, then $y' = uv' + vu'$ and if $y = \frac{u}{v}$ then $y' = \frac{vu' - uv'}{v^2}$

On the basis of above information :

- a) Find derivative of $f(x) = 20x$, using first principle method (2)
- b) Find derivative using quotient rule, if $f(x) = \frac{x}{\tan x}$ (2)