

BUDHA DAL PUBLIC SCHOOL, PATIALA

FINAL EXAMINATION (10 March 2026)

Class : XI

Subject : Mathematics (041) (Set-A)

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 $A = \{2, 3, 5, 7, 8\}$, $B = \{1, 5, 9\}$ then $B - A$ is
a) $\{2, 3\}$ b) $\{1, 5, 9\}$ c) $\{1, 9\}$ d) $\{2, 3, 7, 8\}$
- Q2. Range of $\sin \theta$ is
a) $(0, 1)$ b) $[-1, 1]$ c) $[0, 1]$ d) $[-1, 1]$
- Q3. Value of $\sin \frac{7\pi}{12}$ is
a) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ b) $\frac{\sqrt{3}+1}{2}$ c) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ d) $\frac{\sqrt{3}-1}{2}$
- Q4. If $A = \{2\}$, $B = \{3, 4, 5\}$, $C = \{5, 6\}$ then $n[A \times (B - C)]$ is
a) 1 b) 2 c) 6 d) 3
- Q5. If A and B are two sets then $A \cap (A \cup B)$ equals to
a) A b) B c) ϕ d) $A \cap B$
- Q6. If a relation R is defined on the set Z of integers by the rule $(a, b) \in R \Leftrightarrow a^2 + b^2 = 25$ then Domain $(R) =$
a) $\{3, 4, 5\}$ b) $\{0, 3, 4, 5\}$ c) $\{0, \pm 3, \pm 4, \pm 5\}$ d) none of these
- Q7. Conjugate of $i^3 - 4$ is
a) $i^3 + 4$ b) $4 - i$ c) $-4 + i$ d) $-4 - i$
- Q8. $|3i|$ is equal to
a) 3 b) -3 c) $3\sqrt{-1}$ d) $-3\sqrt{-1}$
- Q9. If $a + ib = c + id$ then
a) $a^2 + c^2 = 0$ b) $b^2 + c^2 = 0$ c) $b^2 + d^2 = 0$ d) $a^2 + b^2 = c^2 + d^2$
- Q10. If $|x - 1| > 5$ then
a) $x \in (-4, 6)$ b) $x \in [-4, 6]$
c) $x \in (-\infty, -4) \cup (6, \infty)$ d) $x \in [-\infty, -4] \cup [6, \infty)$

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- Q11. If $\frac{-2}{x-3} > 0$, then
 a) $x \in (3, \infty)$ b) $x \in (-\infty, 3)$ c) $x \in [3, \infty)$ d) $x \in (-\infty, 3]$
- Q12. The number of ways in which five articles can be put in four boxes is
 a) 4^4 b) 5^4 c) 4^5 d) 5^5
- Q13. The number of terms in the expansion of $(x - 2y)^{10}$ are
 a) 10 b) 12 c) 20 d) 11
- Q14. The slope of line whose equation is $5x + 6y = 7$ is
 a) $\frac{5}{6}$ b) $\frac{6}{5}$ c) $-\frac{5}{6}$ d) -5
- Q15. The distance of point $P(1, -3)$ from the line $2y - 3x = 4$ is
 a) 13 b) $\frac{7}{\sqrt{13}}$ c) $\sqrt{13}$ d) $\sqrt{7}$
- Q16. If the distance between the points $P(0, a, 3)$ and $Q(3, 0, 7)$ is $\sqrt{41}$ then $a =$
 a) -5 b) 5 c) ± 5 d) none of these
- Q17. $\lim_{x \rightarrow 0} (\operatorname{cosec} x - \cot x)$ is equal to
 a) 1 b) -1 c) 0 d) 2
- Q18. If ${}^nC_{12} = {}^nC_8$ then n is equal to
 a) 20 b) 12 c) 6 d) 30

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) : The value of k for which $\frac{3}{4}, k, \frac{4}{3}$ are in G.P is 1 only.

Reason (R) : If x, y, z are in G.P. then $y^2 = xz$

Q20. Assertion (A): Radius of circle $(x - 1)^2 + (y + 2)^2 = 7$ is $\sqrt{7}$

Reason (R) : For the circle $(x - h)^2 + (y - k)^2 = r^2$, centre is (h, k)

Section - B

Q21. Write all subsets of the set $\{1, 2, 3\}$

Q22. Find domain of function $f(x) = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$

Q23. If the arcs of the same lengths in two circles subtend angles 65° and 110° at centre. Find the ratio of their radii.

Q24. Find modules of $\frac{1+i}{1-i} - \frac{1-i}{1+i}$

Q25. Expand $\left(\frac{2}{x} - \frac{x}{2}\right)^5$ by binomial theorem

Q26. If

Q27.

Q28.

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Section – C

Q26. If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ $B = \{2, 4, 6, 8\}$ $C = \{3, 4, 5, 6\}$ $D = \{6, 7, 8, 9\}$ then find

a) $(B - C)'$ b) $B \cap D'$

Q27. Prove that $\frac{\sin(x+y)}{\sin(x-y)} = \frac{\tan x + \tan y}{\tan x - \tan y}$

Q28. In how many ways can be the letters of word PERMUTATIONS be arranged if the

- a) Words start with P and end with S.
b) Vowels are all together

Q29. Find the co-ordinates of the foci, the vertices, the length of major axis, the eccentricity and the latus rectum of ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$

Q30. Find the derivative of $x^{-4} (3 - 4x^{-5})$

Q31. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (i) No man (ii) One man

Section – D

Q32. If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, find value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, $\tan \frac{x}{2}$

Q33. The sum of first three terms of G.P is $\frac{13}{12}$ and their product is -1 . Find the common ratio and terms.

Q34. Find the co-ordinates of the foot of perpendicular from the point $(-1, 3)$ to the line $3x - 4y - 16 = 0$

Q35. Find mean and variance for the following:

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	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, Geeta and Meera selected two angles A and B. Such that $A, B \in (0, \frac{\pi}{2})$ and $\sin A = \frac{3}{5}$ $\cos B = \frac{9}{41}$

Answer the following based on above information

- a) Evaluate $\cos 2A$
b) Evaluate $\sin A \sin B + \cos A \cos B$
c) Evaluate $\tan(A + B)$

(1)

(1)

(2)

A-



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

One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be

- i) A diamond (1)
- ii) Not an ace (2)
- iii) A black card (1)

OR

not a diamond

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 the derivative of $f(x) = 99x$, using first principle method (2)
- b) Find the derivative of $f(x) = 5x^2 \cos x$, using product rule (2)

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