



P.V.G.'s
Mukhtangan English School & Jr. College,
44, Vidyanagari, Parvati, Pune - 411009.
Annual Examination (2025-26)
Standard - XI

Subject : Mathematics

Marks - 80

Date : 27.03.2026

Time : 8.30 am to 11.30 am

General Instructions:

- 1) Section A: Q1 contains **Ten** multiple choice type questions carrying **Two** marks each.
Q2 contains **Five** very short answer type questions carrying **One** mark each.
- 2) Section B : contains **Twelve** short answer type questions carrying **Two** marks each.
(Attempt any **Ten**)
- 3) Section C : contains **Seven** short answer type questions carrying **Three** marks each
(Attempt any **Five**)
- 4) Section D : contains **Eight** long answer type questions carrying **Four** marks each
(Attempt any **Five**)
- 5) Use of log table is allowed. Use of calculator is not allowed.
- 6) Figures to right indicate full marks.
- 7) For each MCQ, only first attempt will be considered for evaluation.
- 8) Start answer to each section on a new page.

Section - A

Q.1 Select and write the most appropriate answer from the given alternatives for each sub-question: (2 marks each) (20)

- i) The value of $\cos A \cos (60^\circ - A) \cos (60^\circ + A)$ is equal to _____
A) $\frac{1}{2} \cos 3A$ B) $\cos 3A$ C) $\frac{1}{4} \cos 3A$ D) $4 \cos 3A$
- ii) If $kx + 2y - 1 = 0$ and $6x - 4y + 2 = 0$ are identical lines, then determine k.
A) -3 B) $-\frac{1}{3}$ C) $\frac{1}{3}$ D) 3
- iii) If the line $2x - y = 4$ touches the hyperbola $4x^2 - 3y^2 = 24$, the point of contact is
A) (1,2) B) (2,3) C) (3,2) D) (-2,-3)
- iv) The equation of the tangent to the circle $x^2 + y^2 = 4$ which are parallel to $x + 2y + 3 = 0$ are
A) $x - 2y = 2$ B) $x + 2y = \pm 2\sqrt{3}$
C) $x + 2y = \pm 2\sqrt{5}$ D) $x - 2y = \pm 2\sqrt{5}$

- v) In a jar there are 5 black marbles and 3 green marbles. Two marbles are picked randomly one after the other without replacement. What is the possibility that both the marbles are black?
- A) $\frac{5}{14}$ B) $\frac{5}{8}$ C) $\frac{5}{12}$ D) $\frac{5}{16}$
- vi) If n is an odd positive integer then the value of $1 + (i)^{2n} + (i)^{4n} + (i)^{6n}$ is
- A) $-4i$ B) 0 C) $4i$ D) 4
- vii) In how many ways can 10 examination paper be arranged so that the best and the worst papers never comes together.
- A) $9 \times 8!$ B) $8 \times 8!$ C) $8 \times 9!$ D) $9 \times 9!$
- viii) $\lim_{x \rightarrow \infty} \left[\frac{(2x+3)^7 (x-5)^3}{(2x-5)^{10}} \right] =$
- A) $\frac{3}{8}$ B) $\frac{1}{8}$ C) $\frac{1}{6}$ D) $\frac{1}{4}$
- ix) If $f(x) = 2x^2 + bx + c$ and $f(0) = 3$ and $f(2) = 1$ then $f(1) =$ _____
- A) -2 B) 0 C) 1 D) 2
- x) $f(x) = \frac{(16^x - 1)(9^x - 1)}{(27^x - 1)(32^x - 1)}$ for $x \neq 0$
 $= k$ for $x = 0$
- is continous at $x = 0$, then $k =$
- A) $\frac{8}{3}$ B) $\frac{8}{5}$ C) $\frac{-8}{15}$ D) $\frac{20}{3}$

Q.2 Answer the following questions: (1 marks each)

(5)

i) Convert $\left(\frac{7\pi}{3}\right)^c$ in the degree measure.

ii) Find the value of $\cos\left(\frac{19\pi}{3}\right)^c$

iii) Find the slope of line which passes through points $(7, -1)$ and $(-3, 1)$.

iv) If $P = \{1, 2, 3\}$ and $Q = \{1, 4\}$ find sets $P \times Q$.

v) Find x if $f(x) = 0$ where $f(x) = \frac{5x - 6}{7}$

Section B

Attempt any Ten of the following questions: (2 marks each)

(20)

- Q.3 Convert $75^{\circ} 30'$ in the radian measure.
- Q.4 Find the polar co-ordinate of points whose cartesian co-ordinates are (1, -1)
- Q.5 Find the value of $\cot(-1110^{\circ})$.
- Q.6 Find the equation of line parallel to X-axis and making an intercept of 3 units on Y-axis.
- Q.7 Find the center and radius of the circle $x^2 + y^2 - 6x - 8y - 24 = 0$
- Q.8 Find the equation of parabola with vertex at origin, axis along Y - axis and passing through point (-10, -5).
- Q.9 Find the modulus and argument of the complex number $Z = -4 - 4i$
- Q.10 Find n if $(n + 3)! = 110 \times (n + 1)!$
- Q.11 Write the interval $[-3, 4)$ in set-builder form.
- Q.12 If $f(x) = \frac{a - x}{b - x}$, $f(2)$ is undefined and $f(3) = 5$, find a and b.
- Q.13 Find the value of ${}^{15}C_4 + {}^{15}C_5$.
- Q.14 Evaluate $\lim_{x \rightarrow 0} \left(\frac{\sin 8x}{\tan 4x} \right)$

SECTION C

Attempt any FIVE of the following: (3 marks each)

(15)

- Q.15 Find the equation of circle for which diameters are $2x + y = 6$ and $3x + 2y = 4$ when radius of circle is 9.
- Q.16 Find the equation of the line passing through the origin and which bisects the portion of the line $3x + y = 6$ intersected between the co-ordinate axes.
- Q.17 For two events A and B of a sample space S, if $P(A) = \frac{3}{8}$, $P(B) = \frac{1}{2}$ and $P(A \cup B) = \frac{5}{8}$ then find
- a) $P(A \cap B)$ b) $P(A' \cap B')$ c) $P(A' \cup B')$

Q.18 If odds in favour of X solving a problem are 4:3 and odds against Y solving the same problem are 2:3. Find probability if

i) X solving the problem

ii) Y solving the problem

Q.19 Find the number of arrangement of letters in the word "CONSTITUTION" that begin and end with N.

Q.20 Eight men and six women sit around a table. How many of sitting arrangements will have no two women together?

Q.21 Evaluate $\lim_{x \rightarrow 1} \left[\frac{1}{x-1} + \frac{2}{1-x^2} \right]$

SECTION -D

Attempt any five of the following questions: (4 marks each)

(20)

Q.22 Find co-ordinates of focus, equation of directrix, length of latus.rectum and the co-ordinates of end points of latus rectum of the parabola. $y^2=28x$.

Q.23 Prove that: $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$

Q.24 Find the co-ordinates of the foot of the perpendicular drawn from the point A(-2, 3) to the line $3x - y - 1 = 0$

Q.25 Find the square root of $3 - 4i$

Q.26 Find n if $\frac{(2n)!}{7!(2n-7)!} : \frac{n!}{4!(n-4)!} = 24 : 1$

Q.27 Evaluate $\lim_{x \rightarrow 3} \left[\frac{\sqrt{2x+3} - \sqrt{4x-3}}{x^2-9} \right]$

Q.28 Examine continuity $f(x) = \begin{cases} 4 + \sin x, & \text{for } x < \pi \\ 3 - \cos x, & \text{for } x > \pi \\ 0, & \text{for } x = \pi \end{cases}$

if it is discontinuous then identify the type of discontinuity.

Q.29 Solve for x : $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$

