EXAMINATION MATERIAL ZUEB - 2022

MATHEMATICS XII

SECTION "A" MULTIPLE CHOICE QUESTION (MCQ'S)

Chapter no 1	Function and Limits
SUB TOPIC	1.6 Limit of Function

1) $\lim_{n \to \infty} [1 + \frac{1}{n}]^{-n}$
   a. -1
   b. 1
   c. e
   d. 1/e

2) $\lim_{x \to 0} \frac{sin6x}{2x}$ =
   a. ½
   b. 3
   c. 2
   d. 1/3

3) A function $f(x) = x + |x|\ is$
   a. Even function
   b. Odd function
   c. Neither even nor odd function
   d. Circular function

4) $\lim_{x \to 0} \frac{ex-1}{x}$ =
   a. e
   b. 1
   c. 0
   d. e^x

5) $\lim_{x \to 0} \frac{sincx}{x}$ =
   a. 1
   b. 1/c
   c. 0
   d. C

6) The least upper bound (l.u.b) of {-10,-5,8,-$\frac{1}{3}$,15,21} is

a. -10
b. 8
c. 15
d. 21

7) If $f: [-1,5] \rightarrow R$ is defined by $f(x) = x^2$ then $f(-2) =$

a. 4
b. -2
c. -4
d. Undefined

8) $\lim_{x \to 0} \frac{sin\frac{2}{3}x}{2x} =$

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

9) If f(x) = sin x cos x then f(x) is

a. even
b. odd
c. both even and odd
d. either even nor odd

10) If f : R→R is given f(x) = $\sqrt{x}$ then f(16)=

a. -4
b. 6
c. 4
d. 8

11) $\lim_{x \to 0} \frac{\sin x}{\tan x}$

a. -1
b. 1
c. 0
d. ∞

12) The function f(x) = cos x is

a. Even
b. Odd
c. Modulus
d. Inverse

13) Limit of sequence $a_n = 1/n$ is

a. -1
b. 1
c. 0
d. ∞

14) $\lim_{x \to 3} \frac{x^2-9}{x-3}$

a. 1/6
b. 6
c. 0
d. ∞

15) A function 'f' is said to be odd whenever

a. f(x) = 0
b. f(-x) = f(x)
c. f(-x) = -f(x)
d. f(x) =1

16) A function 'f' is said to be even whenever

a. f(x) = 0
b. f(-x) = f(x)
c. f(-x) = -f(x)
d. f(x) =1

Chapter no 2	The Straight Line
SUB TOPIC	**1.1** Cartesian coordinate system Distance between two given points **2.2** Division of given line segment in a given ratio **2.4** Curve & equations Slope (or gradient) of a line Slope of the line joining two given points Conditions for three points to be collinear Parallel & perpendicular lines Angles from one line to another in the slope form **2.5** Lines parallel to the axes of coordinates. Various forms of equation of straight line. Deduction of one form of an equation of a line from another.

1) If A is two third the way from P to Q then A divides $\overline{PQ}$ in the ratio

a. 2:1
b. 1:2
c. 2:3
d. 3:2

2) The slope of the bisector of the 1st and the 3rd quadrant is

a. 0
b. -1
c. 1
d. 2

3) The distance of point (2,3) from x – axis

a. 5
b. 3
c. 2
d. 1

4) The coordinates of the centroid of the triangle whose vertices are (2,8),(8,2) and (9,9)are

a. (3,4)
b. (19,19)
c. $\left[\frac{19}{3},\frac{19}{3}\right]$
d. $[\frac{1}{3},\frac{1}{3}]$

5) The inclination of x –axis is

a. 90^o
b. 0^o
c. 45^o
d. 270^o

6) The distance of the point (3,2) from y- axis is

a. 5 units
b. 3 units
c. **2 unit**s
d. $\sqrt{3}$ unit

7) The slope of a straight line which bisects the first and second quadrants is

a. 1
b. -1
c. 0
d. ∞

8) The point of concurrency of the medians of a triangle is called

a. incentre
b. centroid
c. orthocenter
d. cicumcentre

9) Every linear equation represents a

a. Straight line
b. Circle
c. Curve
d. Point

10) The x – intercept of $y = x^2 + x - 6$ are

a. -3 and 2
b. 3 and 2
c. -3 and -2
d. 3 and -2

11) The measure of angle from a line with slope 3 to the line with slope 5 is

a. $\tan^{-1}(\frac{1}{5})$
b. $\tan^{-1}(\frac{2}{9})$
c. $\mathbf{\tan^{-1}(\frac{1}{8})}$
d. $\tan^{-1}(\frac{3}{5})$

12) The point of concurrency of the altitude of a triangle is called

a. in-centre
b. ortho-cenre
c. centroid
d. cicum-centre

13) The distance between points (μcosθ, μsinθ)and(0,0)is

a. 1 unit
b. -1 unit
c. μ^2 unit
d. μ unit

14) The slope of vertical line is

a. 0
b. 1
c. -1
d. ∞

15) Three points A,B and C are collinear if

a. ΔABC = 1
b. ΔABC = 0
c. ΔABC = -1
d. ΔABC = ∞

16) If the slope of a line is -2 and y – intercept is 3, the equation of line is

a. 2x +y – 3 = 0
b. x + 2y – 3 = 0
c. 3x +2y = 0
d. x +y +2 =0

17) If two line are perpendicular then

a. $a_1a_2+b_1 b_2 = 1$
b. $a_1a_2+b_1 b_2 = 0$
c. $a_1a_2+b_2 b_1 = 0$
d. $a_1a_2+b_1 b_2 = -1$

18) The point of intersection of internal bisectors of the angles triangle is called

a. Incentre
b. Centroid
c. Orthocentre
d. Circumcenre

19) If straight line is parallel to y – axis then its slope is

a. 1
b. 0
c. -1
d. ∞

Chapter no 3	The General Equation of Straight lines
SUB TOPIC	1.2 The general line equation. Angle between two lines from L_2 to L_1 in the general form. Point of intersection of two straight lines. Concurrency of three lines. Equations of lines in the matrix form. Line through the intersection of two given lines. 1.3 Position of a point with respect to a given straight line. Distance of a point from a line. Area of triangle of a triangle.

1) If two or more straight lines meet at one point then the lines are said to be

a. Concurrent

b. Parallel

c. Perpendicular

d. Coincident

2) Sum of the slopes of pair of line $ax^2 + 2hxy + by^2 = 0$

a. $\frac{a}{b}$

b. $\frac{h}{b}$

c. $\frac{-h}{2a}$

d. $\boldsymbol{\frac{-2h}{b}}$

3) The area of a triangle whose vertices are (0,0),(2,0) and (0,4) is

a. 8 sq.units

b. 4 sq.units

c. 2 sq.units

d. 1 sq.units

4) If the equation of a straight line is $3x - y + 5 = 0$ then the point (1,2) lies

a. Above the line

b. Below the line

c. On the line

d. On both sides of the line

5) Two straight lines coincident by $ax^2 + 2hxy + by^2 = 0$

a. $a + b = 0$

b. $a = b$

c. $h^2 + ab = 0$

d. $\boldsymbol{h^2 - ab = 0}$

6) The slope of the line 3x – 5y – 15 =0 is

a. $\frac{5}{3}$
b. $\frac{-5}{3}$
c. $\frac{-3}{5}$
d. $\mathbf{\frac{3}{5}}$

7) 3x – 5y – 15 = 0 is parallel to the line

a. 5x -3y – 15 = 0
b. 3x + y – 15 = 0
c. x – y + 15 = 0
d. 6x – 10y + 15 = 0

8) Area of triangle ABC, When A,B,C are collinear, is

a. ∞
b. Zero
c. Positive
d. Negative

9) The line 4x + 5y +2 = 0 is perpendicular to the line

a. 5x + 4y – 2 = 0
b. 4x + 5y – 2 = 0
c. -5x – 4y + 2 = 0
d. 5x – 4y + 3 = 0

10) If a line is perpendicular of y – axis then its equations is

a. x= 0
b. y = constant
c. x = constant
d. y = 0

11) If a line is parallel to x- axis its equation is

a. x = 0
b. y = 0
c. x = constant
d. y = constant

Chapter no 4	Differentiability
SUB TOPIC	4.1 Derivative of a function at a point. 4.2 Composite function. 4.3 Implicit function. 4.4 Parametric function. Higher derivative.

1) $\frac{d}{dx}$ Ln x^2 =
   a. ax^{0-1}
   b. 2/x
   c. x^2 inx
   d. a^2 in a dx

2) $\frac{d}{dy}$(cosec^{-1}y)
   a. $\frac{-1}{y\sqrt{y^2-1}}$
   b. $\frac{1}{y\sqrt{1-y^2}}$
   c. $\frac{-1}{y\sqrt{1-y^2}}$
   d. $\frac{1}{y\sqrt{y^2-1}}$

3) $\frac{d}{dx}\left(ln\, e^{x^2}\right) =$
   a. x^2
   b. 2x
   c. $\frac{1}{e^{x^2}}$
   d. ln x^2

4) $\frac{d}{dx}\ ln\,(x^3+1)$
   a. $\frac{3x}{1+x^3}$
   b. $\frac{1}{x^3+1}$
   c. $\frac{1}{x^3+1}ln(x^3+1)$
   d. $\frac{3x^2}{1+x^3}$

5) $\frac{d}{dx}(cos^{-1}x) =$
   a. $\frac{1}{\sqrt{1-x^2}}$
   b. $\frac{1}{1-x^2}$
   c. $-\frac{1}{\sqrt{1-x^2}}$
   d. $\frac{1}{\sqrt{x^2-1}}$

6) $\frac{d}{dx}(sec^2x)$ =

a. $\sec^2 x$
b. tan x
c. $\sec^2 x \tan x$
d. **$2 \sec^2 x \tan$** x

7) If f (x) = sin 9x the $f'(x) =$

a. Cos 9x
b. –cos 9x
c. 9 cosx
d. 9cos 9x

8) $\frac{d}{dx}(sin^{-1}x) =$

a. $\frac{1}{\sqrt{1+x^2}}$
b. $\boldsymbol{\frac{1}{\sqrt{1-x^2}}}$
c. $\frac{-1}{\sqrt{1+x^2}}$
d. $\frac{-1}{\sqrt{1-x^2}}$

9) If f(y) = $\log_a y$, then d/dy ($\log_a y$)

a. $\frac{1}{y} in\ a\ dy$
b. $\frac{1}{y\ In\ e} dy$
c. $\frac{1}{y}\ a^y\ dy$
d. $\boldsymbol{\frac{1}{y\ In\ a}}$

10) Derivative of x^n with respect 'x' is

a. x^a in a
b. x^a in x
c. $x^a/\ln a$
d. nx^{n-1}

11) If y = ln sin x, then $\frac{dy}{dx} =$

a. $\frac{1}{\sin x}$
b. cos x
c. cot x
d. tan x

12) If y = $\log_a x$ then dy =

a. $\frac{1}{x} in\ a\ dx$

b. $\frac{1}{x\ In\ e} dx$

c. $\boldsymbol{\frac{1}{x\ In\ a} dx}$

d. $\frac{1}{x} a^x dx$

13) If f(x) = $\tan^{-1} 3x$, then f' (x) is

a. $\frac{1}{1+x^2}$

b. $\frac{1}{9+x^2}$

c. $\boldsymbol{\frac{3}{1+9x^2}}$

d. $\frac{3}{1+3x^2}$

14) If y = cot x, then dy =

a. –cosec x dx

b. – $\text{cosec}^2 x$

c. – $\boldsymbol{\text{cosec}^2 x\ dx}$

d. $\cot^2 x$ dx

Chapter no 5	Application of Differential Calculus
SUB TOPIC	5.3 Increasing and decreasing function.

1) The necessary condition for f(x) to have extreme value is

a. f^{n} (x) = 0
b. f' (x) = 0
c. f(x) = 0
d. $f'(x) = 1$

2) A function f(x) is maximum at x =a, if:

a. $f"(a) = 0$
b. $f"(a) < 0$
c. $f"(a) > 0$
d. $f"(a) = a$

3) A function f(x) is minimum at x = a if

a. $f"(a) = 0$
b. $f"(a) < 0$
c. $f"(a) > 0$
d. $f"(a) = a$

4) The necessary conditions for f (x) to have an extreme value of

a. $f'(x) = 1$
b. $f(x) = 0$
c. $f'(x) = 0$
d. $f^{"}(x) = 0$

5) If a line is perpendicular of y – axis then its equations is

a. x= 0
b. y = constant
c. x = constant
d. y = 0

Chapter no 6	Anti-derivatives
SUB TOPIC	**6.1 Anti-derivation or integration.** **6.3 Integration by substitution.** **Integration by completing the squares.** **6.10 Area under a curve.** **6.11 Differentials equations.**

1) $\int x^{-1}\,dx =$

a. x + c
b. 1/x + c
c. 1/x^1 + c
d. In x + c

2) $\int cosecxdx =$

a. –cosecx + c
b. – cot x +
c. -cosecx cot x + c
d. None of these

3) $\int \frac{f'(x)}{f(x)}$dx =

a. In $\boldsymbol{f(x)+c}$
b. In $f'(x)+c$
c. $f(x)+c$
d. $\frac{1}{f(x)}+c$

4) An antiderivative of a function is called

a. Definite integral
b. Indefinite integral
c. Summation
d. Differential

5) $\int \cos x\, e^{sinx} dx =$

a. $e^{cosex}+c$
b. $\boldsymbol{e^{sinx}+c}$
c. $-e^{cosx}+c$
d. sin x e^{cosx} + c

6) $\int sec\ x\ dx$

a. Cosec cot x +c
b. Insecxtanx +c
c. In tan x/2 +c
d. –cosec x cot x + c

7) $\int \frac{2x}{1+x^2}\ dx =$

a. $\frac{1}{1+x^2}$
b. $\tan^{-1} x + c$
c. $\frac{1}{ln\ (1+x^2)}$
d. $\mathbf{ln(1+x^2) + c}$

8) If $\frac{dy}{dx}$ = 1 then

a. v = x + c
b. $y = x^2 + c$
c. $y^2 = x + c$
d. y = x + c

9) $\int \tan 45^o\ dx$

a. x + c
b. $\sec^2 45^o + c$
c. $\ln \sec 45^o + c$
d. $\cot 45^o + c$

10) $\int e^x(\sin x + \cos x)\ dx =$

a. $e^x \cos x + c$
b. $-e^x \cos x + c$
c. $\mathbf{e^x \sin x + c}$
d. $e^x + c$

11) $\int e^{2x} dx$:

a. $2e^{2x} + c$
b. $e^{2x} + c$
c. $e^{2x+1} + c$
d. $\mathbf{\frac{1}{2} e^{2x} + c}$

12) $\int (ax+b)^n dx, if\ n = -1, a \neq 0$:

a. $\mathbf{\frac{ln(ax+b)}{a} + c}$
b. $\frac{(ax+b)^{n+1}}{a(n+1)} + c$
c. $\frac{(ax+b)}{(n+1)} + c$
d. None of these

13) $\int \tan 2\, x\, dx =$

a. In sec 2x + c

b. $\frac{\boldsymbol{ln} \sec 2x}{2} + \boldsymbol{c}$

c. $\frac{in\ tan\ 2x}{2} + c$

d. $\frac{sec^2\ 2x}{2} + c$

14) $\int 3e^{3x} dx =$

a. $3e^{3x}$

b. e^{3x} +c

c. $\frac{e^{3x}}{3} + c$

d. $none\ of\ these$

15) $\int \frac{(1+x)}{x^2+2x} dx =$

a. In(x^2 +2x)

b. In (2x+1) + c

c. In(x^2 +2x) +c

d. In $\sqrt{x^2 + 2x} + c$

16) $\frac{d}{dx}(sin^2 x) =$

a. 2sinx

b. **2sinx cosx**

c. -2cox

d. sinx cosx

Chapter no 7 Circle	
SUB TOPIC	**7.2** **Tangents and normal to a circle.** **Equation of the chord joining two points on the circle.** **Points of intersection of the straight line Y = mx + c & the circle $X^2 + Y^2 = r^2$.** **Condition of tangency of a line to a circle.** **The equations of tangents and normal using derivative.** **Length of the tangent segment from the point P_1 (x_1 , y_1) to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$** **Condition of normality.**

1) The length of the tangent from the point (1,2) to the circle $x^2 + y^2 - 2 = 0$ is

a. $\sqrt{2}$
b. 2
c. $\sqrt{6}$
d. $\boldsymbol{\sqrt{3}}$

2) The radius of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$

a. $\boldsymbol{\sqrt{g^2 + f^2 - c}}$
b. $\sqrt{g^2 - f^2 - c}$
c. $\sqrt{g^2 + f^2 + c}$
d. $\sqrt{g^2 - f^2 - c^2}$

3) Equation of a circle with centre, (0,-5) and diameter 4 units is

a. $\boldsymbol{x^2 + (y + 5)^2 = 4}$
b. $x^2 + (y-5)^2 = 4^2$
c. $(x-5)^2 + (y-0)^2 = 4^2$
d. $(x+5)^2 + y^2 = 4$

4) The circle has its centre on y - axis

a. $x^2 + y^2 + 2x + 3y = 0$
b. $x^2 + y^2 + 3x + 2y = 0$
c. $\boldsymbol{x^2 + y^2 - 2y - 3 = 0}$
d. $x^2 + y^2 + 3x + 2y = 2$

5) Equation of a circle with centre at the origin and radius 2r is x^2 is $x^2 + y^2 =$

a. r^2
b. $2r^2$
c. $\boldsymbol{4r^2}$
d. 4r

6) The length of the tangent drawn from (3,1) to the circle $2x^2 + 2y^2 + 5 = 0$ is

a. $\sqrt{12.5}$

b. $\frac{12}{5}$

c. $\frac{25}{2}$

d. $\frac{5}{\sqrt{2}}$

7) Centre of the circle $x^2 + y^2 + 6x - 8y + 3 = 0$

a. (3,4)

b. (-3,-4)

c. (3, -4)

d. (-3,4)

8) The centre of circle $2x^2 + 2y^2 + 8x = 0$

a. (0,0)

b. (-4,0)

c. (8,0)

d. (-2,0)

9) Which of the following circles passes through the origin

a. $x^2 + y^2 + 8x + 7 = 0$

b. $\mathbf{x^2 + y^2 + 8x + 11y = 0}$

c. $x^2 + y^2 - 9y + 11 = 0$

d. $x^2 + y^2 - 8x + 11y + 19 = 0$

Chapter no 8	Parabola ,Ellipse and Hyperbola
SUB TOPIC	**8.4 Equation of chords.** **Equation of tangents & normal to conics.** **Two tangents & condition of tangency to conics.**

1) The distance between foci of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

a. $\frac{2a}{e}$
b. 2a
c. 2c
d. $\frac{2b^2}{a}$

2) If e = $\frac{3}{2}$ then the conic is a/an

a. Circle
b. Ellipse
c. Parabola
d. Hyperbola

3) The vertex of parabola $(y + 2)^2 = 4 (x – 1)$ is

a. (1,2)
b. (-2,1)
c. (1-2)
d. (-1,2)

4) The equation $ax^2 + by^2 + 2gx + 2fy + c = 0$ represents a parabola if

a. $a = 0, b \neq 0$
b. $a = b = 0$
c. $a \neq b$
d. $a = b \neq 0$

5) Semi latus rectum of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1\ is$

a. $\frac{2b^2}{a}$
b. $\frac{2b}{a^2}$
c. $\frac{b^2}{a}$
d. $\frac{a^2}{2ab}$

6) In rectangular hyperbola the value of eccentricity is

a. $\frac{a}{c}$
b. $\frac{c}{a}$
c. $\sqrt{2}$
d. $\sqrt{3}$

7) The length of the latus rectum of parabola is $x^2=8y$

a. 2units

b. 4 units

c. 6 units

d. 8 units

8) The centre of ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1\ is$

a. (5,0)

b. (3,5)

c. (0,0)

d. (5,3)

9) If e = 2 then conic is 2e

a. Ellipse

b. Parabola

c. Hyperbola

d. Circle

10) If $b^2 = a^2 (e^2 – 1)$ then conic is

a. Parabola

b. Ellipse

c. Hyperbola

d. Circle

11) ln a hyperbola c^2 =

a. $a^2 + b^2$

b. $a^2 – b^2$

c. $b^2 – a^2$

d. $2b^2 / a^2$

12) If $b^2 = a^2 (1- e^2)$ then conic is

a. Parabola

b. Ellipse

c. Hyperbola

d. Circle

Chapter no 9 Vectors	
SUB TOPIC	**9.5 The scalar and vector products of two vectors.** **9.6 Scalar products of three vectors.** **9.7 Applications of vectors to mechanics.**

1) If two vectors $\vec{A} \nless \vec{0}$ and $\vec{B} \nless \vec{0}$ are such that $\vec{A}.\vec{B} = 0$ *then the vector are*

a. Parallel

b. Perpendicular

c. Opposite

d. Equal

2) The position vector of a point P(x,y,z) is

a. $\vec{P}$

b. $|\overline{OP}|$

c. $|\bar{P}|$

d. $\overline{OP}$

3) If $\overrightarrow{b} = \overline{P_1}\,\overline{P_2}$ where P_1 (1,0,0) and P^2 (3,1,-2), then $|\vec{b}|$=

a. $\sqrt{14}$

b. $\sqrt{11}$

c. 6

d. 3

4) The unit vector in the direction of $\vec{r} = 2i + j - k$ *is*

a. $\frac{1}{\sqrt{6}}(2i + j - k)$

b. $\sqrt{6}(2i + j - k)$

c. $6(2i + j - k)$

d. $\frac{1}{6}(2i + j - k)$

5) If three vectors $\vec{a}$,$\vec{b}$,$\vec{c}$ are coplanar than [$\vec{a}$,$\vec{b}$,$\vec{c}$]=

a. 1

b. 0

c. $\vec{c}$

d. $\vec{a}$

6) Direction cosines of the vector i + j + k are

a. $\frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

b. $\frac{-1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

c. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

d. 1,1,-1

7) If $\vec{a}$ and $\vec{b}$ are perpendicular then $\vec{a}.\vec{b}$=

a. 1
b. -1
c. 0
d. π/2

8) Magnitude of vector (1, - $\sqrt{3}$, $\sqrt{5}$,) is

a. 9
b. 3
c. $\sqrt{3}$
d. $\sqrt{5}$

9) If two vectors $\vec{A} \neq \vec{0}$ and $\vec{B} \neq \vec{0}$ are such that $\vec{A}.\vec{B}$= 0 then the vectors are

a. Parallel
b. Perpendicular
c. Opposite
d. Equal