Roll No. | | | | | | | (To be filled in by the candidate)

Mathematics **H.S.S.C (12th)1st Annual 2023** Time : 30 Minutes

Paper : II SWL-12-23 Objective – (ii) Marks : 20

Paper Code	8	1	9	3

Note: –You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION–A

Q.1	Questions	A	B	C	D
1.	Focus of parabola $x^2=4ay$ is	(a,0)	(0,a)	(−b,0)	(0,−a)
2.	Two lines l_1 and l_2 with slope m_1 and m_2 are perpendicular if:	$m_1 = m_2$	$m_1m_2=1$	$m_1m_2+1=0$	$m_1=\frac{2}{m_2}$
3.	The lines represented by $ax^2+2hxy+by^2=0$ are parallel if:	$h^2-ab=0$	$h^2-ab>0$	$h^2-ab<0$	$h^2=a+b$
4.	A solution of $x+2y<6$ is:	(8,0)	(0,8)	(5,1)	(1,2)
5.	The line $y=mx+c$ intersect the circle $x^2+y^2=a^2$ at most _____ point/s	One	Two	three	Infinite
6.	Equation of point circle is:	$x^2+y^2=1$	$x^2+y^2=-1$	$x^2+y^2=0$	$x^2-y^2=0$
7.	Equation of horizontal line through (a,b) is	$y=a$	$x=a$	$x=b$	$y=b$
8.	For hyperbola value of eccentricity is:	$e=0$	$e<1$	$e=1$	$e>1$
9.	If $f(x)=e^{\sqrt{x}-1}$, then $f'(x)=$.....	$\frac{1}{2\sqrt{x}}e^{\sqrt{x}-1}$	$e^{\sqrt{x}-1}$	$\frac{1}{2x}$	$\frac{e^{\sqrt{x}-1}}{\sqrt{x}}$
10.	$\int\frac{x+2}{x+2}dx=$.....	1+c	x+c	−x+c	$2x$
11.	$\lim_{\theta\to0}\frac{1-\cos\theta}{\theta}=$.....	1	0	−1	∞
12.	$\lim_{n\to\infty}(1-\frac{1}{n})^n=$.....	e^{-1}	e	e^2	$\frac{1}{e^2}$
13.	If $x=at^2, y=2at$, then $\frac{dy}{dx}=$.....	$\frac{2}{y}$	$\frac{2a}{y}$	$2ay$	$2a$
14.	$\underline{i}\cdot(\underline{i}\times\underline{k})=$.....	$\underline{i}$	$-\underline{j}$	0	1
15.	If $f(x)=\cos x$, then $f'(\sin^{-1}x)=$.....	$-\sin x$	$-x$	1	$\frac{1}{\sqrt{1-x^2}}$
16.	If $y=e^{2x}$, then $y_4=$.....	$16e^{2x}$	$8e^{2x}$	$4e^{2x}$	$-16e^{2x}$
17.	The projection of $\vec{a}=\underline{i}-\underline{j}$ along $\underline{b}=\underline{j}+\underline{k}$ is:	$\frac{1}{\sqrt{2}}$	$\frac{-1}{\sqrt{2}}$	1	−2
18.	The order of differential equation $y\left(\frac{dy}{dx}\right)^2+2x=0$ is:	1	−1	2	−2
19.	$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}}\cos\theta\,d\theta=$.....	$\frac{\sqrt{3}-1}{2}$	$\frac{\sqrt{3}}{2}$	$1+\frac{1}{\sqrt{3}}$	$\frac{2}{\sqrt{3}}-1$
20.	$\int ln\,x\,dx=$.....	$(ln\,x)^2+c$	$x\,ln\,x+c$	$x\,ln\,x-x+c$	$-x\,ln\,x+c$

www.taleem360.com

Roll No. | | | | | | | (To be filled in by the candidate)

Mathematics **H.S.S.C (12th)1st Annual 2023** Time : 2:30 Hours

Paper : II SWL-12-23 Subjective Marks : 80

Note: - Section B is compulsory. Attempt any three questions from section C.

SECTION – B

2. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Express the volume V of a cube as a function of the area of its base

ii. For any real valued function, $g(x)=\frac{1}{\sqrt{x^2}}$; $x\neq 0$,find $gog(x)$

iii. Evaluate $\lim_{x\to 0}\frac{1-\cos x}{\sin^2 x}$

iv. Differentiate $\frac{2x-3}{2x+1}$ w.r.t. x

v. Find $\frac{dy}{dx}$ if $x^2-4xy-5y=0$

vi. Differentiate $(\sin 2\theta-\cos 3\theta)^2$ w.r.t. θ

vii. Find $f'(x)$ if $f(x)=\ln(e^x+e^{-x})$

viii. Find y_2 if $y=x^2e^{-x}$

ix. Apply Maclaurin series expansion to prove that, $\sqrt{1+x}=1+\frac{x}{2}-\frac{x^2}{8}+\frac{x^3}{16}+\ldots$

x. Find the extreme values for the function, $f(x)=x^2-x-2$

xi. Define objective function.

xii. Graph the solution set of the inequality, $3x-2y\geq 6$

3. Write short answers to any Eight parts. **(8 x 2 = 16)**

i. Evaluate $\int\frac{3x+2}{\sqrt{x}}dx,\quad (x>0)$

ii. Evaluate $\int\frac{e^{2x}+e^x}{e^x}dx$

iii. Evaluate $\int\sec n\ dx$

iv. Evaluate $\int\frac{x}{\sqrt{4+x^2}}dx$

v. Evaluate $\int a^{x^2}x\,dx\quad (a>0,\ a\neq 1)$

vi. Evaluate $\int\frac{x+b}{(x^2+2bx+c)^{\frac{1}{2}}}dx$

vii. Evaluate definite integral $\int_1^2(x^2+1)dx$

viii. Find the volume of the parallelepiped determined by, $\underline{u}=\underline{i}+2\underline{j}-\underline{k}$, $\underline{v}=\underline{i}-2\underline{j}+3\underline{k}$, $\underline{w}=\underline{i}-7\underline{j}-4\underline{k}$

ix. Find the value of $[\underline{i}\quad \underline{i}\quad \underline{k}]$

x. Find the constant α such that the given vectors are coplanar. $\underline{i}-\underline{j}+\underline{k}$, $\underline{i}-2\underline{j}-3\underline{k}$ and $3\underline{i}-\alpha\underline{j}+5\underline{k}$

xi. Write the formula to find the volume of tetrahedron.

xii. Write two properties of cross product.

(Turn Over)

www.taleem360.com

SWL-12-23

4. Write short answers to any Nine parts. **(9 x 2 = 18)**

i. Find distance between A and B, midpoint of AB, where A(3,1), B(-2,-4)

ii. Find slope and inclination of line joining A(3,-2) and B(2,7)

iii. By means of slope, show that (-1,-3),(1,5) and (2,9) are collinear.

iv. Find equation of line through A(-6,5) having slope 7

v. Find point of intersection of $x-2y+1=0$ *and* $2x-y+2=0$

vi. Find the lines represented by $2x^2+3xy-5y^2=0$

vii. Find the distance from P(6,-1) to the line $6x-4y+9=0$

viii. Find the equation of circle with centre (5,-2) and radius 4

ix. Write down equation of tangent and normal to $x^2+y^2=25$ at (4,3)

x. Write equation of parabola with Focus (1,2); vertex (3,2)

xi. Find foci and eccentricity of the ellipse $x^2+4y^2=16$

xii. Find equation of hyperbola with centre (0,0) Focus (6,0) and vertex (4,0)

xiii. Find centre and radius of circle $4x^2+4y^2-8x+12y-25=0$

SECTION – C

Note: Attempt any Three questions. Each question carries 10 marks

5. (a) Evaluate the following limit 5

$$\lim_{\theta\to 0}\frac{1-\cos p\theta}{1-\cos q\theta}$$

(b) Show that $\frac{dy}{dx}=\frac{y}{x}$ if $\frac{y}{x}=\tan^{-1}\frac{x}{y}$ 5

6. (a) Evaluate $\int\frac{e^x(1+\sin x)}{1+\cos x}\,dx$ 5

(b) Find an equation of the perpendicular bisector of the segment joining the points A(5,3) and B(9,8) 5

7. (a) Evaluate $\int_0^{\frac{\pi}{4}}\frac{1}{1+\sin x}\,dx$ 5

(b) Minimize $z=2x+y$, subject to the constraints $x+y\geq 3$; $7x+5y\leq 35$; $x\geq 0$; $y\geq 0$ 5

8. (a) Divide 20 into two parts so that the sum of their squares will be minimum. 5

(b) Find equations of the tangents to the circle $x^2+y^2=2$ parallel to the $x-2y+1=0$ 5

9. (a) Find the centre, foci, eccentricity, vertices and directrices of ellipse $x^2+16x+4y^2-16y+76=0$ 5

(b) Prove that by vector method $\sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta$ 5

www.taleem360.com