MATHEMATICS HSSC-II

SECTION – A (Marks 20)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اول لازمی ہے۔اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔لیڈ پنسل کا استعمال ممنوع ہے۔

Version No.				
4	0	0	8	1

ROLL NUMBER						

Answer Sheet No. ___________

ہر سوال کے سامنے دیے گئے ، کریکولم کے مطابق درست دائرہ کو پر کریں۔

Invigilator Sign. ___________

Fill the relevant bubble against each question according to curriculum:

Candidate Sign. ___________

	Question	A	B	C	D	A	B	C	D
1.	$\lim\limits_{x\to 0}\dfrac{(1+2x)^2-1}{x}=$	1	2	4	6	○	○	○	○
2.	$\lim\limits_{x\to\infty}\left(1+\dfrac{2}{x}\right)^{\frac{x}{2}}=$	0	1	e	$\dfrac{1}{e}$	○	○	○	○
3.	$\dfrac{d}{dx}\left(e^x+2e^{-2x}\right)=$	e^x-4e^{-2x}	e^x+4e^{-2x}	$e^x-\frac{e^{-2x}}{2}$	e^x-2e^{-2x}	○	○	○	○
4.	If $\dfrac{dy}{dx}=\dfrac{3}{2}x^{\frac{1}{2}}-2x$, then $\dfrac{d^2y}{dx^2}=$	$\dfrac{3}{2}x^{\frac{1}{2}}-2$	$\dfrac{3}{4}x^{\frac{-1}{2}}-2$	$\dfrac{1}{4}x^{\frac{1}{2}}-2$	$\dfrac{4}{3}x^{\frac{-1}{2}}-2$	○	○	○	○
5.	If $y=\dfrac{1}{8}\sin 2x$, then the value of $\dfrac{d^4y}{dx^4}$ is:	$2\sin 2x$	$-2\sin 2x$	$2\cos 2x$	$-2\cos 2x$	○	○	○	○
6.	If $\vec{r}(t)=(1+t^2)\hat{i}+\sin t\hat{j}+\cos 2t\hat{k}$, then $\lim\limits_{t\to 0}\vec{r}(t)=$	$\hat{i}+\hat{j}+\hat{k}$	$\hat{i}+\hat{k}$	$\hat{i}+\hat{j}-\hat{k}$	$\hat{i}+\hat{j}$	○	○	○	○
7.	If $\vec{r}(t)=t^2\hat{i}-2t\hat{j}$, then $\vec{v}(t)=$	$2t\hat{i}-\hat{j}$	$2t\hat{i}-2\hat{j}$	$t\hat{i}-2\hat{j}$	$t\hat{i}-\hat{j}$	○	○	○	○
8.	$\displaystyle\int\frac{\cos x}{\sin x}dx=$	$\ln\lvert\sin x\rvert+c$	$\ln\lvert\cos x\rvert+c$	$-\ln\lvert\sin x\rvert+c$	$-\ln\lvert\cos x\rvert+c$	○	○	○	○
9.	If $2\displaystyle\int_0^2 x\,dx=3k-2$, then the value of '$k$' is:	2	3	4	6	○	○	○	○
10.	If $A(5,-5), B(-2,0)$ and $C(0,2)$ are vertices of a triangle then its centroid is:	(1,1)	(−1,−1)	(−1,1)	(1,−1)	○	○	○	○
11.	If $4x-2y=3$, then the slope of the line is:	−3	−2	2	3	○	○	○	○

	Question	A	B	C	D	A	B	C	D
12.	The equation of circle with centre $(-1,-1)$ and radius 2 is:	$(x-1)^2+(y-1)^2=2$	$(x-1)^2+(y-1)^2=4$	$(x+1)^2+(y+1)^2=2$	$(x+1)^2+(y+1)^2=4$	○	○	○	○
13.	If $x^2+y^2+4x+4y=0$ is an equation of circle then its radius is:	2	$2\sqrt{2}$	3	$3\sqrt{2}$	○	○	○	○
14.	If $y^2=8x$ is an equation of parabola, then its focus is:	$(0,4)$	$(0,2)$	$(2,0)$	$(4,0)$	○	○	○	○
15.	If $\frac{d^2y}{dx^2}-\left(\frac{dy}{dx}\right)^2+y=3x$ is a differential equation, then its order and degree respectively are:	1,2	2,1	2,2	2,3	○	○	○	○
16.	If $\frac{1}{x}\frac{dy}{dx}=2$, then solution $y(x)$ of differential equation is:	x^2+c	$\frac{x^2}{2}+c$	$2x^2+c$	$-x^2+c$	○	○	○	○
17.	If $f(x,y)=x^2+3y$, then $\frac{\partial f}{\partial x}(1,1)=$	0	2	3	5	○	○	○	○
18.	If $f(x,y)=e^{x+y}$, then $\frac{\partial f}{\partial y}(1,0)$ is:	0	1	e	$\frac{1}{e}$	○	○	○	○
19.	If $f(x)=x^3-2x+1$ and $x_0=0$, then $f'(x_0)$ is:	-2	-1	1	2	○	○	○	○
20.	The value of Δx to approximate $\int_0^2 (x^2+1)dx$ for $(n=4$ sub intervals) by 'Trapezoidal Rule' is:	0	0.25	0.5	1	○	○	○	○

$$\vec{v}(t)=\frac{d}{dt}\left(\vec{r}(t)\right)$$

——2HA-I 25008- 40081 (B) ——

ROLL NUMBER						

30

MATHEMATICS HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 80**

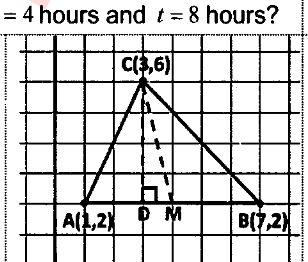
SECTION – B (Marks 48)

Q. 2 Solve the following: **(12 x 4 = 48)**

(i)	Evaluate: $\lim_{\theta \to 0} \frac{1-\cos\theta}{\sin^2\theta}$	04	OR	If $f(x,y) = 3x^3 + 7x^2y + xy^2 + 5y^3$, then find: **a.** Degree of homogeneous function **b.** Verify Euler's theorem for $f(x,y)$	1+3
(ii)	Find the value of 'k' if $f(x)$ is continuous at $x=1$ $f(x) = \begin{cases} \frac{3x^2-3}{x-1}, & x \neq 1 \\ 2(k-1)x, & x = 1 \end{cases}$	04	OR	If line $x - 2y + \ell = 0$ is tangent to the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, then find: **a.** Value of ℓ **b.** Equation of tangent **c.** Length of latus rectum	04
(iii)	If $y = 3\theta^3 - \theta^{\frac{-3}{2}}$ and $u = 2\theta^2 - \theta^{\frac{-1}{2}}$ then find $\frac{dy}{du}$	04	OR	Compute two iterations up to 4 decimal places of $f(x) = x^3 - 5x + 1$ by using Newton Raphson's method with initial start $x_o = 0.5$	04
(iv)	If $\vec{r}(t) = t^3\hat{i} + e^{-2t}\hat{j} + \sin 2t\,\hat{k}$ is position vector of a moving particle at time (t), then find: a. Velocity vector $\vec{v}(t)$ b. Acceleration vector $\vec{a}(t)$	04	OR	Find the equation of line passing through the point of intersection of lines $\begin{matrix} x+y=3 \\ x-y=1 \end{matrix}$ and parallel to line $x-3y=2$ and write it into slope intercept form.	3+1
(v)	Evaluate: $\int (3t+1)(t-1)dt$	04	OR	Find the equation of the circle passing through the points $(4,0),(0,5)$ and $(0,0)$	04
(vi)	Find the solution of differential equation $\frac{dy}{dx} = 1 + e^x y + y + e^x$	04	OR	Find the area under the graph of $f(x) = 3x^2 - 2x$ over the interval $[1,3]$	04
(vii)	Find the extreme values of $f(x) = \frac{1}{3}x^3 - x^2 - 3x + 6$	04	OR	If $3x^2 - 2xy - 8y^2 = 0$ is 2nd degree homogeneous equation then find: a. Pair of straight lines b. Angle between these lines	04
(viii)	Find the area of a triangle if its vertices are $A(5,4), B(2,1)$ and $C(7,3)$	04	OR	Evaluate $\int x^2 \cos x\,dx$ using integration by parts method	04
(ix)	Find the equation of tangent and normal to parabola $x^2 = 8y - 8$ at $x = 4$	04	OR	Find $\frac{dy}{dx}$, if $y = (2x+3)^{\frac{3}{2}}$ by first principle	04
(x)	Evaluate $\int \frac{e^x dx}{e^{2x}+1}$ by substitution method	04	OR	If $\frac{x^2}{9} - \frac{y^2}{4} = 1$ is an equation of hyperbola then find: **a.** Centre **b.** Vertices **c.** Foci **d.** Equation of asymptotes	04
(xi)	If $f(x,y) = \sqrt{x^3 + y^3}$, then find: a. $\frac{\partial f}{\partial x}$ b. $\frac{\partial f}{\partial y}$	04	OR	If $f(x) = 2x - 3$ and $g(x) = 3x + 2$, and $h(x) = f(g(x))$ then find **(i)** $h(x)$ **(ii)** $h^{-1}(x)$ **(iii)** value of x if $h^{-1}(x) = 2$	04
(xii)	Compute four iterations of the function $f(x) = 2x^3 - 5$ in the interval $[0,2]$ by using Bisection method	04	OR	Find $\frac{dy}{dx}$, if $x^3 + 3x^2y^2 + y^3 = 0$	04

SECTION – C (Marks 32)

Note: Solve the following Questions. **(4 x 8 = 32)**

Q.3	The growth of bacteria is given by the function of time (t) (in hours) $f(t) = 500e^{0.25t}$, then find: a. Initial number of Bacteria at t=0 b. Number of Bacteria after $t = 4$ hours c. Number of Bacteria after $t = 8$ hours d. The time if number of Bacteria is $500e^3$. e. Is $f(t)$ continuous at $t = 4$ hours and $t = 8$ hours?	08	OR	If $f(x) = \frac{1}{8}x^3 + \frac{1}{4}x^2 + \frac{2}{x^2} + \frac{1}{2}$, then find: a. Equation of tangent at $x = 2$ in $ax + by = c$ form b. Equation of normal at $x = 2$ c. Test continuity of $f(x)$ at $x = 0$	08
Q.4	In the given ΔABC find equation of: a. Median $\overline{CM}$ b. Altitude $\overline{CD}$ c. Right bisector of $\overline{AB}$ at mid-point, M 	08	OR	In an elliptic ground if $a = 2b$ and $b = 4$ then find: a. Vertices, co-vertices and centre b. Foci c. Eccentricity d. Equation in standard form with center at orgin e. Draw the rough diagram of ellipse using vertices and co-vertices only. (Graph paper is not required)	2+2 +2 +1+1
Q.5	Evaluate: $\int \frac{2x-1}{x^3 - x^2 - 2x}dx$	08	OR	Solve the homogeneous differential equation $2xy\,dy - (x^2 + 3y^2)dx = 0$	08
Q.6	Evaluate: $\int \frac{dx}{4x^3 - x}$	08	OR	a. Approximate $\int_0^2 (3x^2 - 2x)dx$ for $(n = 2$ sub intervals) by using Simpson's Rule b. Find actual value of definite integral c. Calculate difference of both values	5+2 +1

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Version No.				
4	2	0	8	1

ROLL NUMBER						

MATHEMATICS HSSC-II

SECTION – A (Marks 20)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Answer Sheet No. ____________

Invigilator Sign. ____________

ہر سوال کے سامنے دیے گئے، کریکولم کے مطابق درست دائرہ کو پر کریں۔

Fill the relevant bubble against each question according to curriculum:

Candidate Sign. ____________

	Question	A	B	C	D	A	B	C	D
1.	$\lim\limits_{x\to 0}\dfrac{(1+3x)^2-1}{x}=$	1	2	3	6	○	○	○	○
2.	$\lim\limits_{x\to\infty}\left(1+\dfrac{3}{x}\right)^{\frac{x}{3}}=$	0	1	e	$\dfrac{1}{e}$	○	○	○	○
3.	$\dfrac{d}{dx}\left(e^x+3e^{-3x}\right)=$	e^x-9e^{-3x}	e^x+9e^{-3x}	e^x-6e^{-3x}	e^x+6e^{-3x}	○	○	○	○
4.	If $\dfrac{dy}{dx}=2x+\dfrac{5}{2}x^{\frac{3}{2}}$, then $\dfrac{d^2y}{dx^2}=$	$2+\dfrac{5}{2}x^{\frac{1}{2}}$	$2+\dfrac{15}{4}x^{\frac{1}{2}}$	$2-\dfrac{15}{4}x^{\frac{1}{2}}$	$2+\dfrac{5}{2}x^{\frac{3}{2}}$	○	○	○	○
5.	If $y=\dfrac{1}{8}\cos 2x$, then the value of $\dfrac{d^4y}{dx^4}$ is:	$2\cos 2x$	$-2\cos 2x$	$2\sin 2x$	$-2\sin 2x$	○	○	○	○
6.	If $\vec{r}(t)=(t^2-1)\hat{i}+\sin t\hat{j}+\cos 2t\hat{k}$, then $\lim\limits_{t\to 0}\vec{r}(t)$ is =	$\hat{i}+\hat{k}$	$-\hat{i}+\hat{k}$	$-\hat{i}+\hat{j}+\hat{k}$	$-\hat{i}-\hat{j}+\hat{k}$	○	○	○	○
7.	If $\vec{r}(t)=t^2\hat{i}+2t\hat{j}$, then $\vec{v}(t)=$ is:	$2t\hat{i}+\hat{j}$	$2t\hat{i}+2\hat{j}$	$t\hat{i}+2\hat{j}$	$t\hat{i}+\hat{j}$	○	○	○	○
8.	$\displaystyle\int\frac{\sin t}{\cos t}\,dt$ is equal to:	$-\ln\lvert\cos t\rvert+c$	$\ln\lvert\cos t\rvert+c$	$\ln\lvert\sin t\rvert+c$	$-\ln\lvert\sin t\rvert+c$	○	○	○	○
9.	If $2\displaystyle\int_0^3 x\,dx=2k-3$, then the value of '$k$' is:	2	3	4	6	○	○	○	○
10.	If $A(-5,5), B(2,0)$ and $C(0,-2)$ are vertices of a triangle then its centroid is:	$(1,1)$	$(-1,-1)$	$(1,-1)$	$(-1,1)$	○	○	○	○
11.	If $6x-3y=2$, then the slope of the line is:	-3	-2	2	3	○	○	○	○

	Question	A	B	C	D	A	B	C	D
12.	The equation of circle with centre $(1,1)$ and radius 2 is:	$(x+1)^2+(y+1)^2=2$	$(x+1)^2+(y+1)^2=4$	$(x-1)^2+(y-1)^2=2$	$(x-1)^2+(y-1)^2=4$	○	○	○	○
13.	If $x^2+y^2+6x+6y=0$ is an equation of circle then its radius is:	2	$2\sqrt{2}$	3	$3\sqrt{2}$	○	○	○	○
14.	If $y^2=-8x$ is an equation of parabola, then its focus is:	$(0,-4)$	$(0,-2)$	$(-2,0)$	$(-4,0)$	○	○	○	○
15.	If $\frac{d^3y}{dx^3}-\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^2=x^4$ is a differential equation, then its order and degree respectively are:	3,1	1,3	2,3	3,2	○	○	○	○
16.	If $\frac{1}{x^2}\frac{dy}{dx}=3$ then solution $y(x)$ of differential equation is:	x^3+c	$\frac{x^3}{3}+c$	$3x^3+c$	$-x^3+c$	○	○	○	○
17.	If $f(x,y)=3x+y^2$, then $\frac{\partial f}{\partial y}(1,1)$ is:	0	2	3	5	○	○	○	○
18.	If $f(x,y)=e^{x-y}$, then $\frac{\partial f}{\partial x}(0,1)$ is:	0	1	e	$\frac{1}{e}$	○	○	○	○
19.	If $f(x)=x^3-2x+3$ and $x_0=0$, then $f'(x_0)$ is:	-2	-1	1	2	○	○	○	○
20.	The value of Δx to approximate $\int_0^2 (x^2-1)dx$ for $(n=4$ sub intervals) by 'Trapezoidal Rule' is:	0	0.25	0.5	1	○	○	○	○

—2HA-I 25008-42081 (D)—

ROLL NUMBER						

32

MATHEMATICS HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 80**

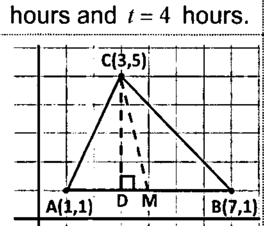
SECTION – B (Marks 48)

Q. 2 Solve the following: **(12 x 4 = 48)**

(i)	Evaluate: $\lim\limits_{\theta \to 0} \dfrac{\sin^2\theta}{1-\cos\theta}$	04	OR	If $f(x,y)=2x^3-5xy^2+3x^2y-4y^3$ then: a. Find degree of homogeneous function b. Verify Euler's theorem for $f(x,y)$	1+3
(ii)	Find the value of 'k' if $f(x)=\begin{cases}\dfrac{2x^2-2}{x-1}, & x\neq 1\\ 3(k-1)x, & x=1\end{cases}$ is continuous at $x=1$	04	OR	If line $x-3y+\ell=0$ is tangent to the ellipse $\dfrac{x^2}{25}+\dfrac{y^2}{16}=1$, then find: a. Value of ℓ. b. Equation of tangent. c. Length of latus rectum	04
(iii)	If $y=\dfrac{1}{3}\theta^3-\theta^{\frac{-1}{2}}$ and $z=\dfrac{1}{2}\theta^2-\theta^{\frac{-3}{2}}$ then find $\dfrac{dy}{dz}$.	04	OR	Compute two iterations up to 4 decimal places of $f(x)=2x^3-5x+1$ by using Newton Raphson's method with initial start $x_o=0.5$	04
(iv)	If $\vec{r}(t)=\sin 2t\hat{i}+\cos t\hat{j}-t^3\hat{k}$ is position vector of a moving particle at time (t), then find: a. Velocity vector $\vec{v}(t)$ b. Acceleration vector $\vec{a}(t)$	04	OR	Find the equation of line passing through the point of intersection of lines $\begin{matrix}x+2y=5\\x-2y=1\end{matrix}$ and parallel to line $x-2y=3$ and write it into slope intercept form.	04
(v)	Evaluate: $\int(2z-3)(z+2)dz$	04	OR	Find the equation of the circle passing through the points $(0,4),(5,0)$ and $(0,0)$	04
(vi)	Find the solution of differential equation $\dfrac{dy}{dx}=2+e^xy+y+2e^x$	04	OR`	Evaluate $\int x^2\sin x\,dx$ using integration by parts method.	04
(vii)	Find the extreme values of $f(x)=\dfrac{1}{3}x^3+\dfrac{1}{2}x^2-6x+5$	04	OR	If $8x^2-2xy-3y^2=0$ is 2nd degree homogeneous equation then find: a. Pair of straight lines b. Angle between these lines	04
(viii)	Find the area of a triangle if its vertices are $A(4,5), B(5,2)$ and $C(6,7)$.	04	OR	Find the area under the graph of $f(x)=6x^2+4x$ over the interval $[1,3]$	04
(ix)	Find the equations of tangent and normal to parabola $x^2=-8y+8$ at $x=4$.	04	OR	Find $\dfrac{dy}{dx}$ if $y=(3x+2)^{\frac{3}{2}}$ by first principle.	04
(x)	Evaluate $\int\dfrac{e^\theta}{e^{2\theta}+1}d\theta$ by substitution method.	04	OR	If $\dfrac{x^2}{16}-\dfrac{y^2}{9}=1$ is an equation of hyperbola then find: a. Centre b. Vertices c. Foci d. Equation of asymptotes	04
(xi)	If $f(x,z)=\sqrt{x^2+z^2}$, then find: a. $\dfrac{\partial f}{\partial x}$ b. $\dfrac{\partial f}{\partial z}$	04	OR	If $f(x)=3x+2$ and $g(x)=2x-3$, and $h(x)=f(g(x))$ then find: (i) $h(x)$ (ii) $h^{-1}(x)$ (iii) value of x if $h^{-1}(x)=2$	04
(xii)	Compute four iterations of the function $f(x)=2x^3-7$ in the interval $[0,2]$ by using Bisection method.	04	OR	Find $\dfrac{dy}{dx}$, when $3x^3-6x^2y^2-5y^3=0$	04

SECTION – C (Marks 32)

Note: Solve the following Questions. **(4 x 8 = 32)**

Q.3	The growth of a virus is the function of time (t) (in hours) $f(t)=200e^{0.5t}$, then find: a. Initial number of virus at $t=0$ b. Number of virus after $t=2$ hours c. Number of virus after $t=4$ hours d. The time when number of virus is $200e^4$. e. Is $f(t)$ continuous at $t=2$ hours and $t=4$ hours.	08	OR	If $f(x)=\dfrac{1}{8}x^3-\dfrac{1}{4}x^2-\dfrac{2}{x^2}+\dfrac{5}{2}$, then find: a. Equation of tangent at $x=2$ in $ax+by=c$ form. b. Equation of normal at $x=2$ c. Test the continuity of $f(x)$ at $x=0$	08
Q.4	In the given ΔABC find equation of: a. Median $\overline{CM}$ b. Altitude $\overline{CD}$ c. Right bisector of $\overline{AB}$ at mid-point M  	08	OR	In an elliptic ground $b=\dfrac{1}{2}a$ and $a=8$ find: a. Vertices and co-vertices b. Foci c. Eccentricity d. Equation in standard form with centre at origin e. Draw the rough diagram of ellipse using vertices and co-vertices only. (Graph paper is not required)	2+2+2 +1+1
Q.5	Evaluate: $\int\dfrac{2x+1}{x^3+3x^2+2x}dx$	08	OR	Solve the homogeneous differential equation $2xydy-(3x^2+y^2)dx=0$	08
Q.6	Evaluate: $\int\dfrac{dy}{9y^3-y}$	08	OR	a. Approximate $\int_0^2(3x^2+2x)dx$ for ($n=2$ sub intervals) by using Simpson's Rule b. Find actual value of definite integral c. Calculate difference of both values	5+2 +1

33

FEDERAL BOARD OF INTERMEDIATE AND SECONDARY EDUCATION ISLAMABAD

MATHEMATICS HSSC-II

(Curriculum 2000) (OLD)

SECTION – A (Marks 20)

Time allowed: 25 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed.

Do not use lead pencil.

حصہ اول لازمی ہے۔ اس کے جوابات اسی صفحہ پر دے کر ناظم مرکز کے حوالے کریں۔ کاٹ کر دوبارہ لکھنے کی اجازت نہیں ہے۔ لیڈ پنسل کا استعمال ممنوع ہے۔

Version No.				
4	0	0	8	1

ROLL NUMBER						

Answer Sheet No. ____________

Invigilator Sign. ____________

ہر سوال کے سامنے دیے گئے، کریکولم کے مطابق درست دائرہ کو پر کریں۔

Fill the relevant bubble against each question according to curriculum: **Candidate Sign.** ____________

	Question	A	B	C	D	A	B	C	D
1.	If $f(x)=2x-3$, then $f^{-1}(x)=$	$\frac{1}{2}(x-3)$	$\frac{1}{2}(x+3)$	$\frac{1}{2}(-x+3)$	$-\frac{1}{2}(x+3)$	○	○	○	○
2.	$\lim\limits_{x\to 0}\frac{x}{\lvert x\rvert}=$ ________ $(x<0)$	0	∞	1	-1	○	○	○	○
3.	$\frac{d}{dx}(\text{Sinh}^{-1}x)=$	$\frac{1}{\sqrt{1+x^2}}$	$\frac{-1}{\sqrt{1+x^2}}$	$\frac{1}{\sqrt{1-x^2}}$	$\frac{-1}{\sqrt{1-x^2}}$	○	○	○	○
4.	$1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^6}{6!}+......=$	$\cos x$	$\sin x$	$\ln(1+x)$	$\ln(1-x)$	○	○	○	○
5.	$\frac{d}{dx}\left(\ln\sqrt{x}\right)\rvert_{x=1}=$	1	0.5	2	0	○	○	○	○
6.	If $\int\frac{f'(x)}{f(x)}dx=\ln\lvert\cos x\rvert+c$, then $f(x)=$	$\sin x$	$\tan x$	$\cos x$	$\cot x$	○	○	○	○
7.	For what value of λ, $\int_0^{\lambda}\cos(\pi-x)dx=+1$	π	$-\pi$	$\frac{\pi}{2}$	$-\frac{\pi}{2}$	○	○	○	○
8.	Evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}\sin x dx$	1	-1	0	2	○	○	○	○
9.	What is the area bounded by the curve $y=\lvert x\rvert$ from $x=-1$ to $x=0$?	1	$\frac{1}{2}$	$\frac{1}{4}$	2	○	○	○	○
10.	A function $y=f(x)$ is said to be an increasing function in $[a,b]$ if:	$f'(x)=0\ \ \forall x\in]a,b[$	$f'(x)<0\ \ \forall x\in]a,b[$	$f'(x)>0\ \ \forall x\in]a,b[$	$f'(x)$ does not exist in $[a,b]$	○	○	○	○
11.	What is the general solution of the differential equation $ydx+xdy=0$?	$y=cx$	$y=\frac{c}{x}$	$y=c-x$	$y=\ln x+c$	○	○	○	○

	Question	A	B	C	D	A	B	C	D
12.	What is measure of angle between the lines $y=x-1$ and $y=2-x$?	$90°$	$150°$	$60°$	$45°$	○	○	○	○
13.	What is the condition that the two lines $a_1x+b_1y+c_1=0$, $a_2x+b_2y+c_2=0$ are parallel?	$a_1a_2+b_1b_2=0$	$a_1b_2+b_1a_2=0$	$a_1b_2=b_1a_2$	$a_1a_2=b_1b_2$	○	○	○	○
14.	Which is the equation of the straight line with $x-$intercept $=+2$ and $y-$intercept $=+3$	$2x-3y=6$	$3x-2y=6$	$3x+2y=6$	$2x+3y=6$	○	○	○	○
15.	Which of the following half planes is the solution of the inequality $x\geq 0$?	Right half plane	Left half plane	Upper half plane	Lower half plane	○	○	○	○
16.	If the point $(4,5)$ is center of the circle that touches $y-$axis, then radius of the circle is:	4	5	16	25	○	○	○	○
17.	The eccentricity of parabola is:	0	1	<1	>1	○	○	○	○
18.	The parametric equations $x=a\sec\theta,\ y=b\tan\theta$ represent a(an):	Circle	Parabola	Ellipse	Hyperbola	○	○	○	○
19.	The vector $\underline{\hat{k}}\times(\underline{\hat{j}}\times\underline{\hat{i}})=$	$\underline{0}$	$-\underline{k}$	$-\underline{i}$	$-\underline{j}$	○	○	○	○
20.	Find value of α if vectors $6i-8j+2k$ and $3i+2\alpha j-k$ are mutually perpendicular?	2	-2	1	-1	○	○	○	○

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ROLL NUMBER						

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MATHEMATICS HSSC–II

(Curriculum 2000) (OLD)

Time allowed: 2:35 Hours **Total Marks Sections B and C: 80**

SECTION – B (Marks 48)

Q. 2 Solve the following parts. **(12 x 4 = 48)**

(Use of graph paper is not necessary. Candidates can make their own grid on answer book)

(i)	Without finding inverse, state the domain and range of f^{-1}, where $f(x)=2+\sqrt{x-1}$	04	OR	Solve the differential equation. $\frac{dy}{dx}+\frac{2xy}{2y+1}=x$	04
(ii)	Evaluate the indefinite integral $\int(1+\sqrt{x})^2 dx,\ (x>0)$	04	OR	Find a vertex whose magnitude is 4 and is parallel to $2\underline{i}-3\underline{j}+6\underline{k}$	04
(iii)	If $\tan y(1+\tan x)=1-\tan x$, then show that $\frac{dy}{dx}=-1$.	04	OR	Find the extreme values for the function defined by $f(x)=x^2-x-2$	04
(iv)	Use differentials to find (approximately) the values of $\sqrt[4]{17}$	04	OR	Find an equation of the circle with centre at $(\sqrt{2},-3\sqrt{3})$ and radius 4	04
(v)	Evaluate $\int\frac{dx}{\sqrt{x+1}-\sqrt{x}}$	04	OR	Show that $2x^2-xy+5x-2y+2=0$ represents a pair of straight lines.	04
(vi)	Evaluate $\int_0^1\frac{3x}{\sqrt{4-3x}}dx$	04	OR	Find y_2 if $x^2+y^2=a^2$	04
(vii)	Find the values of m and n, so that the function f is continuous at $x=3$; where $f(x)=\begin{cases} mx \text{ if } x<3 \\ n \text{ if } x=3 \\ -2x+9 \text{ if } x>3\end{cases}$	04	OR	Show that the lines $\begin{matrix}3x-4y-3=0\\5x+12y+1=0\\32x+4y-17=0\end{matrix}$ are concurrent.	04
(viii)	Find the equation of the straight line through the point $(2,-9)$ and the intersection of the lines $2x+5y-8=0$ and $3x-4y-6=0$	04	OR	Find the work done, if the point at which the constant force $\underline{F}=4\underline{i}+3\underline{j}+5\underline{k}$ is applied to an object, moves from $P_1(3,1,-2,)$ to $P_2(2,4,6)$	04
(ix)	Find the focus, vertex and directrix of the parabola $y^2=-8(x-3)$	04	OR	Evaluate $\int\sqrt{1-\cos 2x}dx$	04
(x)	Determined whether the point $P(-5,6)$ lies outside, on or inside the circle. $x^2+y^2+4x-6y-12=0$	04	OR	Find the area between the $x-$axis and the curve $y=4x-x^2$	04
(xi)	Find an equation of the ellipse having centre at $(0,0)$, Focus at $(0,-3)$ and one vertex at $(0,4)$.	04	OR	Differentiate $\ln(x^2+2x)$ w.r.t x, using Chain Rule.	04
(xii)	Find equations of tangent normal to $y^2=4ax$ at $(at^2,2at)$	04	OR	Find the volume of the parallelopiped determined by $\underline{u}=\underline{i}+2\underline{j}-\underline{k},\ \underline{v}=\underline{i}-2\underline{j}+3\underline{k},\ \underline{w}=\underline{i}-7\underline{j}-4\underline{k}$	04

SECTION – C (Marks 32)

Note: Solve the following Questions. **(4 x 8 = 32)**

(Use of graph paper is not necessary. Candidates can make their own grid on answer book)

Q.3	Evaluate $\lim_{\theta\to 0}\frac{1-\cos p\theta}{1-\cos q\theta}$	08	OR	Find $\frac{dy}{dx}$ if $y=\ln(x+\sqrt{x^2+1})$	08
Q.4	If $y=(\cos^{-1}x)^2$, then verify that $(1-x^2)\frac{d_2y}{dx^2}-x\frac{dy}{dx}-2=0$	08	OR	Find equations of the common tangents to the conics: $y^2=16x$ *and* $x^2=2y$	08
Q.5	Find the points trisecting the join of $A(-1,4)$ and $B(6,2)$	08	OR	Evaluate $\int\sqrt{1+\sin x}dx$ *where* $\left(\frac{-\pi}{2}<x<\frac{\pi}{2}\right)$	08
Q.6	Find the coordinates of the points of intersection of the line $x+2y=6$ with the circle. $x^2+y^2-2x-2y-39=0$	08	OR	Maximize $f(x,y)=2x+5y$ subject to the constraints $2y-x\le 8;\quad x-y\le 4;\quad x\ge 0;\quad y\ge 0$	08