2017 (A) Roll No: ____________

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II TIME ALLOWED: 2.30 Hours

GROUP-I **SUBJECTIVE** MAXIMUM MARKS: 80

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. $8 \times 2 = 16$

(i) If $g(x) = \frac{1}{x^2}$, find $gog(x)$

(ii) Define Continuous Function.

(iii) Evaluate $\lim\limits_{x \to 0} \frac{x}{\tan x}$

(iv) Define Increasing and Decreasing Function.

(v) Differentiate $\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2$ w.r.t 'x'.

(vi) Find $\frac{dy}{dx}$ if $y^2 + x^2 - 4x = 5$

(vii) Differentiate $\cos^{-1}\frac{x}{a}$ w.r.t 'x'.

(viii) Find $\frac{dy}{dx}$ if $y = \sinh^{-1}(x^3)$

(ix) Find $\frac{dy}{dx}$ if $y = \ell n(\tan hx)$

(x) Find $f'(x)$ if $f(x) = \ell n(9 - x^2)$

(xi) Find y_2 if $y = \ell n(1 + x)$

(xii) Find $\frac{dy}{dx}$ if $x^2 - y^2 - 6y = 0$

3. Attempt any eight parts. $8 \times 2 = 16$

(i) Find dy if $y = x^2 - 1$ when x changes from 3 to 3.02.

(ii) Evaluate $\int \frac{\sqrt{y}(y+1)}{y}\, dy$

(iii) Evaluate $\int \frac{1}{1 + \cos x}\, dx$

(iv) Evaluate $\int a^{x^2} . x\, dx$

(v) Evaluate $\int \frac{x^2}{4 + x^2}\, dx$

(vi) Evaluate the integral $\int x\, \ell nx\, dx$

(vii) Evaluate $\int_{-1}^{1} (x^{\frac{1}{3}} + 1)\, dx$

(viii) Evaluate $\int_{0}^{3} \frac{dx}{x^2 + 9}$

(ix) Find the area above the $x -$axis and under the curve $y = 5 - x^2$ from $x = -1$ to $x = 2$

(x) Solve $\frac{dy}{dx} = \frac{y^2 + 1}{e^{-x}}$

(xi) Indicate the solution region by shading the in-equality $2x + 3y \le 12$

(xii) What are Problem Constraints?

P.T.O.

4. Attempt any nine parts. **$9 \times 2 = 18$**

(i) Find the coordinates of the point that divides the join of $A(-6, 3)$ and $B(5, -2)$ in the ratio 2:3 internally.

(ii) The points $A(-5, -2)$ and $B(5, -4)$ are ends of a diameter of a circle. Find the centre and radius of the circle.

(iii) Find an equation of the line having $y-$intercept -7 and slope -5.

(iv) Find an equation of the line through $(5, -8)$ and perpendicular to the join of $A(-15, -8), B(10, 7)$

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

(vi) Find an equation of the circle with centre at $(5, -2)$ and radius 4.

(vii) Write an equation of the parabola with Focus $(-3, 1)$ and directrix $x = 3$.

(viii) Find an equation of the ellipse having centre at $(0, 0)$, focus $(0, -3)$ and one vertex $(0, 4)$.

(ix) Find an equation of the hyperbola with centre $(0, 0)$ focus $(6, 0)$ vertex $(4, 0)$.

(x) Find a unit vector in the direction of the vector $\underline{v} = 2\underline{\hat{i}} + 6\underline{j}$.

(xi) Find α, so that $\left|\alpha\underline{i} + (\alpha+1)\underline{j} + 2\underline{k}\right| = 3$

(xii) Find a vector perpendicular to each of the vectors $\underline{a} = 2\underline{i} + \underline{j} + \underline{k}$ and $\underline{b} = 4\underline{i} + 2\underline{j} - \underline{k}$

(xiii) Prove that the vectors $\underline{i} - 2\underline{j} + 3\underline{k}$, $-2\underline{i} + 3\underline{j} - 4\underline{k}$ and $\underline{i} - 3\underline{j} + 5\underline{k}$ are coplanar.

SECTION-II

NOTE: - Attempt any three questions. **$3 \times 10 = 30$**

5.(a) Prove that $\lim\limits_{x \to 0} \dfrac{a^x - 1}{x} = \log_e a$

(b) If $x = a(\theta + \sin\theta)$, $y = a(1 + \cos\theta)$ then show that $y^2 \dfrac{d^2 y}{dx^2} + a = 0$

6.(a) Evaluate $\displaystyle\int \left(\frac{1 - \sin x}{1 - \cos x}\right) e^x \, dx$

(b) Find an equation of the line through the intersection of the lines $x + 2y + 3 = 0$, $3x + 4y + 7 = 0$ and making equal intercepts on the axes.

7. (a) Evaluate $\displaystyle\int_2^3 \frac{3x^2 - 2x + 1}{(x-1)(x^2+1)} \, dx$

(b) Graph the feasible region of the following system of linear inequalities also and find the corner points $2x + 3y \le 18$, $x + 4y \le 12$, $3x + y \le 12$ $x \ge 0$, $y \ge 0$

8. (a) Find an equation of the circle which passes through the points $A(5, 10)$, $B(6, 9)$, $C(-2, 3)$

(b) Using vector method prove that the Altitudes of a triangle are concurrent.

9.(a) Find the Foci Eccentricity and Vertices of the ellipse $9x^2 + y^2 = 18$

(b) Find volume of the Tetrahedron with vertices $(2, 1, 8)$, $(3, 2, 9)$, $(2, 1, 4)$ and $(3, 3, 10)$

Paper Code Number: 4191

2017 (A)

Roll No: ____________

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II

GROUP-I

OBJECTIVE

TIME ALLOWED: 30 Minutes
MAXIMUM MARKS: 20

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. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) If $f(x)=\frac{1}{x}$ then $f^{-1}(x)=$ (A) x (B) $\frac{1}{x}$ (C) 1 (D) Does not exist

(2) $\underset{x\to 2}{Limit}\frac{x-2}{\sqrt{x}-\sqrt{2}}=$ (A) $\sqrt{2}$ (B) 0 (C) $-\sqrt{2}$ (D) $2\sqrt{2}$

(3) If $y=\cos x,\ u=\sin x$ then $\frac{dy}{du}=$
(A) $\cos x\sin x$ (B) $-\cot x$ (C) $-\tan x$ (D) $-\operatorname{cosec} x$

(4) $\frac{d}{dx}\left(\tan^{-1}\sqrt{\left(\frac{1-\cos x}{1+\cos x}\right)}\right)=$ (A) 1 (B) $\frac{1}{2}$ (C) 0 (D) -1

(5) If $f(x)=\cosh x$ then $(f(x))^2-(f'(x))^2=$ (A) 1 (B) 0 (C) $\frac{1}{2}$ (D) 2^2

(6) A function $f'(x)>0$ then it is:-
(A) Differential (B) Increasing (C) Decreasing (D) Zero

(7) $\frac{d}{dx}(a^x)=$ (A) a^x (B) $a^{3x}\ell na$ (C) $\frac{a^x}{\ell na}$ (D) $a^x\ell na$

(8) $\int\frac{1}{x\ell nx}dx=$ (A) $(\ell nx)^2+c$ (B) $-\frac{1}{x^2}\ell nx+c$ (C) $\ell n(\ell nx)+c$ (D) $\frac{(\ell nx)^2}{2}+c$

(9) $\int e^{\tan x}Sec^2x\,dx=$ (A) $-e^{\tan x}+c$ (B) $e^{\tan x}+c$ (C) $e^{\sec x}+c$ (D) $e^{\cos x}+c$

(10) $\int_{-\infty}^{\infty}\frac{dx}{1+x^2}=$ (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) π

(11) The solution of differential equation $\frac{dy}{dx}=-y$ is:-
(A) $y=e^{-ax}$ (B) $y=ce^{-x}$ (C) $y=e^x$ (D) $y=ce^x$

(12) If $a\neq 0$ and $b\neq 0$, then $y-$intercept of the line $ax+by+c=0$ is:-
(A) $\frac{b}{c}$ (B) $-\frac{b}{c}$ (C) $-\frac{c}{b}$ (D) $\frac{c}{b}$

(13) The distance of point $(-1,3)$ from $x-$axis is:- (A) -1 (B) 3 (C) 2 (D) -4

(14) If $(3,5)$ is the mid point of $(5,a)$ and $(b,7)$ then:-
(A) $a=4,\ b=2$ (B) $a=3,\ b=3$ (C) $a=7,\ b=2$ (D) $a=3,\ b=1$

(15) If ℓ_1 with slope $-\frac{1}{3}$ and ℓ_2 with slope 3 then the angle between ℓ_1 and ℓ_2 lines is:-
(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{2}$ (D) π

(16) $(2,1)$ is in the solution of inequality:-
(A) $2x+y\geq 0$ (B) $x-y>1$ (C) $3x+5y<7$ (D) $2x+y\leq 6$

(17) Equation of tangent to the circle $x^2+y^2=4$ at $(1,\sqrt{3})$ is:-
(A) $\sqrt{3}x+y=4$ (B) $\sqrt{3}x-y=4$ (C) $x-\sqrt{3}y=4$ (D) $x+\sqrt{3}y=4$

(18) Length of minor axis of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is:- (A) $2a$ (B) a (C) $2b$ (D) b

(19) A unit vector is a vector whose magnitude is:- (A) 0 (B) 1 (C) 2 (D) $\frac{1}{2}$

(20) The projection of $-2\hat{i}+3\hat{j}+7\hat{k}$ on $2\hat{j}+\hat{k}$ is:- (A) $\frac{13}{5}$ (B) $\frac{13}{4}$ (C) $\frac{13}{\sqrt{5}}$ (D) 13

2017 (A) Roll No: ____________

INTERMEDIATE PART-II (12^{th} CLASS)

MATHEMATICS PAPER-II TIME ALLOWED: 2.30 Hours

GROUP-II **SUBJECTIVE** **MAXIMUM MARKS: 80**

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. **8 × 2 = 16**

(i) Define the term Odd Function and Even function.

(ii) Find Domain and Range of function $g(x) = \sqrt{x+1}$

(iii) Evaluate $\lim\limits_{x \to 0} \dfrac{\sqrt{x+a} - \sqrt{a}}{x}$

(iv) Differentiate w.r.t. x $\left(\sqrt{x} - \dfrac{1}{\sqrt{x}}\right)^2$

(v) Find $\dfrac{dy}{dx}$ if $y = \sqrt{x + \sqrt{x}}$

(vi) Find $f'(x)$ if $f(x) = e^{\sqrt{x}-1}$

(vii) What is a Stationary Point?

(viii) Differentiate $x^{-3} + 2x^{\frac{-3}{2}} + 3$ w.r.t. x.

(ix) Find $\dfrac{dy}{dx}$ if $y^3 - 2xy^2 + x^2y + 3x = 0$

(x) Differentiate $Sin^3 x$ w.r.t $Cos^2 x$

(xi) Find $\dfrac{dy}{dx}$ if $y = \tanh x^2$

(xii) Find the first two derivatives of $Cos(ax + b)$

3. Attempt any eight parts. **8 × 2 = 16**

(i) Using differential find $\dfrac{dy}{dx}$ if $xy + x = 4$

(ii) Evaluate $\int x\left(\sqrt{x} + 1\right) dx$

(iii) Evaluate $\int \sqrt{1 - \cos 2x}\, dx.$

(iv) Evaluate $\int \cos x \left(\dfrac{\ell n \sin x}{\sin x}\right) dx$

(v) Find $\int x \cos x\, dx$

(vi) Evaluate $\int \ell n\, x\, dx$

(vii) Evaluate $\int_{-1}^{1} \left(x^{\frac{1}{3}} + 1\right) dx$

(viii) Solve the differential equation $x\,dy + y(x-1)\,dx = 0$

(ix) Find the area below the curve $y = 3\sqrt{x}$ and above the x-axis between $x = 1$ and $x = 4$.

(x) Evaluate $\int_{\pi/6}^{\pi/3} Cos t\; dt$

(xi) Define Objective Function.

(xii) Graph the solution region of $2x + 3y \leq 12$

P.T.O.

4. Attempt any nine parts. **$9 \times 2 = 18$**

(i) Find the slope and inclination of the line joining the points $(4, 6)$, $(4, 8)$.

(ii) Find equation of the line bisecting the first and third quadrants.

(iii) Convert $2x - 4y + 11 = 0$ in slope intercept form.

(iv) Check whether the lines are concurrent. $x + 3y - 2 = 0$, $2x - y + 4 = 0$, $x - 11y + 14 = 0$

(v) Find measure of angle of the lines represented by the equation $3x^2 + 7xy + 2y^2 = 0$

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

(vii) Find the directrix of the parabola $y^2 = 8x$

(viii) Find equation of ellipse having Foci $(\pm 3, 0)$ and minor axis of length 10.

(ix) Find an equation of hyperbola having Foci $(0, \pm 6)$ and $e = 2$.

(x) State Parallel Vectors.

(xi) Find the unit vector in the direction of vector $\underline{v} = [3, -4]$

(xii) Define Vector product of two Vectors.

(xiii) Find constant α such that the vectors $\underline{i} - 2\alpha \underline{j} - \underline{k}$, $\underline{i} - \underline{j} + 2k$ and $\alpha\underline{i} - 2\underline{j} + \underline{k}$ are coplanar.

SECTION-II

NOTE: - Attempt any three questions. **$3 \times 10 = 30$**

5.(a) If $f(x) = \begin{cases} 3x & if \quad x \le -2 \\ x^2 - 1 & if \quad -2 < x < 2 \\ 3 & if \quad x \ge 2 \end{cases}$ discuss continuity at $x = 2$

(b) If $y = \tan(p \tan^{-1} x)$ show that $(1 + x^2)y_1 - p(1 + y^2) = 0$

6.(a) Evaluate $\int \sqrt{x^2 - a^2}\, dx$

(b) Find equation of line through the point $(2, -9)$ and intersection of lines $2x + 5y - 8 = 0$ and $3x - 4y - 6 = 0$

7. (a) Evaluate $\int_0^{\pi/4} (1 + Cos^2\theta)\tan^2\theta \, d\theta$

(b) Minimize $z = 2x + y$ subject to constraints $x + y \ge 3$, $7x + 5y \le 35$ $x \ge 0$, $y \ge 0$

8. (a) Find an equation of the parabola whose focus is $F(-3, 4)$ and directrix is $3x - 4y + 5 = 0$

(b) Prove that in any triangle ABC $b^2 = c^2 + a^2 - 2ca\,CosB$; by Vector Method.

9.(a) Find the points of intersection of the conics $3x^2 + 5y^2 = 60$ and $9x^2 + y^2 = 124$

(b) Find the area of the triangle with vertices $A(1, -1, 1)$, $B(2, 1, -1)$ and $C(-1, 1, 2)$ by using Vectors.

Paper Code Number:	4192

2017 (A) Roll No: ____________

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

GROUP-II **OBJECTIVE** MAXIMUM MARKS: 20

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. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) $x = at^2$, $y = 2at$ are parametric equations of a:-
(A) Circle (B) Ellipse (C) Parabola (D) Hyperbola

(2) $\lim\limits_{n \to \infty} \left(1 + \frac{1}{n}\right)^{2n} =$ (A) e^2 (B) e^{-1} (C) $e^{-1/2}$ (D) e^3

(3) $\frac{d}{dx}\left(\frac{a}{x}\right)$ (where a is constant) is:- (A) $\frac{1}{x}$ (B) $-\frac{a}{x}$ (C) $\frac{a}{x^2}$ (D) $-\frac{a}{x^2}$

(4) $\frac{d}{dx} \sinh x =$ (A) $\frac{e^x - e^{-x}}{2}$ (B) $\frac{e^x + e^{-x}}{2}$ (C) $e^x - e^{-x}$ (D) $e^x + e^{-x}$

(5) If $y = e^{2x}$ then $y_2 =$ (A) e^{2x-1} (B) $2e^{2x}$ (C) xe^{2x-1} (D) $4e^{2x}$

(6) $\frac{d}{dx}\left(a^{f(x)}\right) =$
(A) $f'(x)a^{f(x)} \ell na$ (B) $f'(x)a^{f(x)}$ (C) $\frac{f'(x)a^{f(x)}}{\ell na}$ (D) $a^{f(x)}\ell na$

(7) $\frac{d}{dx}(-Cosec\,x) =$ (A) $Cot^2 x$ (B) $Cosec\,x\ Cot\,x$ (C) $Cot\,x$ (D) $Tan\,x\ Sec\,x$

(8) $\int Sin\,x\,Cos\,x\,dx =$ (A) $Sin\,x + c$ (B) $\frac{Cos^2 x}{2} + c$ (C) $\frac{Sin^2 x}{2} + c$ (D) $\left(\frac{Sin\,x}{2}\right)^2 + c$

(9) $\int e^x (Cos\,x + Sin\,x)\,dx =$
(A) $-e^x Sin\,x + c$ (B) $e^{-x} Cos\,x + c$ (C) $e^{-x} Sin\,x + c$ (D) $e^x Sin\,x + c$

(10) $\int_0^1 \frac{dx}{1+x^2} =$ (A) $-\pi/2$ (B) $\pi/3$ (C) $-\pi/3$ (D) $\pi/4$

(11) The degree of the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 3x = 0$ is:- (A) 1 (B) 2 (C) 0 (D) 3

(12) A linear equation in two variables represents:-
(A) Circle (B) Ellipse (C) Parabola (D) Straight line

(13) The slope of the line through the points $(-2, 4)$ and $(5, 11)$ is:- (A) -1 (B) 0 (C) 1 (D) 2

(14) Slope of a line $3x - 2y + 5 = 0$ is:- (A) $\frac{2}{3}$ (B) $-\frac{2}{3}$ (C) $\frac{3}{2}$ (D) $-\frac{3}{2}$

(15) The perpendicular distance of the line $3x + 4y + 10 = 0$ from $(0, 0)$ is:-
(A) 0 (B) 1 (C) 2 (D) 3

(16) $2x + 3y < 5$ is satisfied by:- (A) $(1, 1)$ (B) $(1, 2)$ (C) $(2, 3)$ (D) $(-1, 1)$

(17) The length of the diameter of circle $x^2 + y^2 - 6x + 8y = 0$ is:- (A) 4 (B) 10 (C) 13 (D) 12

(18) The mid point of the line segment joining the foci of an ellipse is called:-
(A) Vertex (B) Centre (C) Directrix (D) Minor axis

(19) The angle between the vectors $2\underline{i} - 3\underline{j} + \underline{k}$ and $2\underline{i} - \underline{j} - \underline{k}$ is:-
(A) $\pi/6$ (B) $\pi/4$ (C) $\pi/2$ (D) π

(20) Projection of $\underline{a} = \underline{i} - \underline{k}$ along $\underline{b} = \underline{j} + \underline{k}$ is:-
(A) $-\frac{1}{\sqrt{2}}$ (B) $\frac{1}{\sqrt{2}}$ (C) $\frac{3}{\sqrt{2}}$ (D) $\frac{1}{2}$

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN

OBJECTIVE KEY FOR INTER (PART-I / II) Annual Examination, 2017.

Name of Subject *Mathematics*

Session ______________

Group: 1st

Q. Nos.	Paper Code 4191	Paper Code 4193	Paper Code 4195	Paper Code 4197
1.	B	A|D	D	A
2.	D	D	B	B
3.	C	C	C	D
4.	B	B	B	C
5.	A	C	D	B
6.	B	B	C	D
7.	D	D	A|D	B
8.	C	C	D	C
9.	B	B	C	B
10.	D	A	B	D
11.	B	B	C	C
12.	C	D	B	A|D
13.	B	C	D	D
14.	D	B	C	C
15.	C	D	B	B
16.	A|D	B	A	C
17.	D	C	B	B
18.	C	B	D	D
19.	B	D	C	C
20.	C	C	B	B

Group: 2nd

Q. Nos.	Paper Code 4192	Paper Code 4194	Paper Code 4196	Paper Code 4198
1.	C	D	C	A
2.	A	B	A	B
3.	D	B	D	C
4.	B	F.C	B	D
5.	D	A	D	D
6.	A	C	A	A
7.	B	A	B	D
8.	C	D	C	C
9.	D	B	D	C
10.	D	D	D	C
11.	A	A	A	D
12.	D	B	D	B
13.	C	C	C	B
14.	C	D	C	F.C
15.	C	D	C	A
16.	D	A	D	C
17.	B	D	B	A
18.	B	C	B	D
19.	F.C	C	F.C	B
20.	A	C	A	D