2018 (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 × 2 = 16**

(i) Define explicit function and give an example.

(ii) Find $\frac{f(a+h)-f(a)}{h}$ and simplify where $f(x)=\cos x$

(iii) Prove that $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e$

(iv) Find by definition, the derivative of $2-\sqrt{x}$ w.r.to 'x'.

(v) Find $\frac{dy}{dx}$ if $y=\frac{\left(\sqrt{x}+1\right)\left(x^{3/2}-1\right)}{x^{1/2}-1}$, $x\neq 1$

(vi) Differentiate $\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2$ w.r.to 'x'.

(vii) Find $\frac{dy}{dx}$ if $y^2-xy+4-x^2=0$

(viii) Differentiate $\tan^3\theta\sec\theta$ w.r.to 'θ'.

(ix) Find $\frac{dy}{dx}$ if $x=y\sin y$

(x) Differentiate $(\ell n\, x)^x$ w.r.to 'x'.

(xi) Find $f'(x)$ if $f(x)=x^3e^{1/x}$, $x\neq 0$

(xii) Find y_2 if $x^2+y^2=a^2$

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

(i) Find δy and dy if $y=\sqrt{x}$ when x changes from 4 to 4.41.

(ii) Evaluate $\int\frac{\sin x+\cos^3 x}{Cos^2 x\sin x}\,dx$

(iii) Evaluate $\int\frac{1}{x\ell n x}\,dx$

(iv) Evaluate $\int x\sin x\,dx$

(v) Evaluate $\int e^{-x}(\cos x-\sin x)\,dx$

(vi) Evaluate $\int\frac{5x+8}{(x+3)(2x-1)}\,dx$

(vii) State the fundamental theorem of calculus.

(viii) Evaluate $\int_1^2\frac{xdx}{x^2+2}$

(ix) Find the area bounded by the curve $y=4-x^2$ and the $x-$axis.

(x) Solve $\sec^2 x\tan y\,dx+\sec^2 y\tan x\,dy=0$

(xi) Graph the inequality $3x+7y\geq 21$

(xii) State the Linear Programming Theorem.

P.T.O.

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

(i) Find "h" such that $A(-1, h)$, $B(3, 2)$ and $C(7, 3)$ are collinear.

(ii) Find an equation of the line passing through $(-5, -3)$ and $(9, -1)$.

(iii) Find the area of the region bounded by the triangle with vertices $A(1, 4)$, $B(2, -3)$ and $C(3, -10)$

(iv) Find value of "p" such that lines $2x - 3y - 1 = 0$, $3x - y - 5 = 0$ and $3x + py + 8 = 0$ meet at a point.

(v) Find the lines represented by $6x^2 - 19xy + 15y^2 = 0$

(vi) Find the focus and vertex of the parabola $x^2 - 4x - 8y + 4 = 0$

(vii) Find equation of parabola with focus $(2, 5)$ and directrix $y = 1$

(viii) Find foci and vertices of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$

(ix) Find an equation of the ellipse with foci $\left(\pm 3\sqrt{3}, 0\right)$ and vertices $(\pm 6, 0)$.

(x) Find the direction cosines of vector $\underline{v} = \underline{i} - \underline{j} - \underline{k}$

(xi) Find real number "α" so that the vectors $\underline{u} = \alpha\underline{i} + 2\alpha\underline{j} - \underline{k}$ and $\underline{v} = \underline{i} + \alpha\underline{j} + 3\underline{k}$ are perpendicular.

(xii) Find the area of the triangle with vertices $A(1, -1, 1)$, $B(2, 1, -1)$ and $C(-1, 1, 2)$.

(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 coplaner.

SECTION-II

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

5.(a) If θ is measured in Radian, then prove that $\lim_{\theta \to 0} \frac{\sin\theta}{\theta} = 1$

(b) Show that $2^{x+h} = 2^x\left[1 + (\ell n 2)h + \frac{(\ell n 2)^2}{\underline{|2}}h^2 + \frac{(\ell n 2)^3}{\underline{|3}}h^3 + ----\right]$

6.(a) Evaluate the indefinite integral $\int \frac{x^2 + 3x - 34}{x^2 + 2x - 15}\,dx$

(b) Find a joint equation of the lines through the origin and perpendicular to the lines $ax^2 + 2hxy + by^2 = 0$

7. (a) Evaluate the integral $\int_0^1 \frac{3x}{\sqrt{4 - 3x}}\,dx$

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

8. (a) Find equations of tangents to the circle $x^2 + y^2 = 2$ which are perpendicular to the line $3x + 2y = 6$

(b) Prove that for any triangle ΔABC $a^2 = b^2 + c^2 - 2bc\ Cos\ A$

9.(a) Discuss and sketch the graph of the equation $25x^2 - 16y^2 = 400$

(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	2018 (A) INTERMEDIATE PART-II (12th CLASS)	Roll No: _____

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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) $Log_e\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}\right)=$ --------, $0<x\leq 1$

(A) $Sech^{-1}x$ (B) $Cosec h^{-1}x$ (C) $Tanh^{-1}x$ (D) $Coth^{-1}x$

(2) The linear function $f(x)=ax+b$ becomes identity function if:-

(A) $a=0,\ b=1$ (B) $a=1,\ b=0$ (C) $a=0,\ b=0$ (D) $a=1,\ b=1$

(3) If $y=e^{f(x)}$ then $y'=$

(A) $e^{f'(x)}.f(x)$ (B) $e^{f(x)}.f'(x)$ (C) $e^{f'(x)}.\log f(x)$ (D) $e^{f'(x)}.f'(x)$

(4) For relative maxima at $x=c$

(A) $f(c)<f(x)$ (B) $f(c)>f(x)$ (C) $f(c)\geq f(x)$ (D) $f(c)\leq f(x)$

(5) If $f'(a-\varepsilon)<0$ and $f'(a+\varepsilon)<0$ then at $x=a$ $f(x)$ has:-

(A) Relative Minima (B) Relative Maxima (C) Point of Inflexion (D) Critical Point

(6) $\frac{1}{2}\frac{d}{dx}\left[Tan^{-1}x-Cot^{-1}x\right]=$

(A) $\frac{-1}{1+x^2}$ (B) $\frac{1}{1+x^2}$ (C) $\frac{1}{1-x^2}$ (D) $\frac{-1}{1-x^2}$

(7) $\int\frac{\log_e Tanx}{Sin2x}.dx=$ (A) $\frac{1}{2}\left(\log_e(Tanx)\right)^2+c$

(B) $\frac{1}{4}\left(\log_e(Tanx)\right)^2+c$ (C) $\frac{1}{2}\log_e\left(Sin2x\right)^2+c$ (D) $\frac{1}{4}\log_e\left(Sin2x\right)^2+c$

(8) $\int e^{-x}(Cosx-Sinx)\,dx=$

(A) $e^{-x}Sinx+c$ (B) $-e^{-x}Sinx+c$ (C) $e^{-x}Cosx+c$ (D) $-e^{-x}Cosx+c$

(9) $3\int_{\pi/2}^{\pi}Sinx.dx=$ (A) 1 (B) 2 (C) 3 (D) 4

(10) Solution of differential equation $(e^x+e^{-x})\frac{dy}{dx}=e^x-e^{-x}$ is $y=$

(A) $\log_a(e^x+e^{-x})+c$ (B) $\log_e(e^x+e^{-x})+c$ (C) $\log_a(e^x-e^{-x})+c$ (D) $\log_e(e^x-e^{-x})+c$

(11) Distance of the point $(3,-7)$ from $x-$axis is:- (A) 3 (B) -3 (C) 7 (D) -7

(12) Inclination of a line perpendicular to $y-$axis is:- (A) 0^o (B) 60^o (C) 30^o (D) 90^o

(13) The slope of a line which is perpendicular to the line $ax+by+c=0$ is:-

(A) $\frac{-a}{b}$ (B) $\frac{b}{a}$ (C) $\frac{-b}{a}$ (D) $\frac{a}{b}$

(14) The point of concurrency of altitudes of a triangle is called:-

(A) In – Centre (B) Orthocentre (C) Circumcentre (D) Centroid

(15) The graph of $2x\geq 3$ lies in:-

(A) Upper Half Plane (B) Lower Half Plane (C) Left Half Plane (D) Right Half Plane

(16) Length of the diameter of the circle $(x+8)^2+(y-5)^2=80$ is:-

(A) 160 (B) $4\sqrt{5}$ (C) $8\sqrt{5}$ (D) 40

(17) Directrix of Parabola $x^2=-16y$ is:-

(A) $x+4=0$ (B) $x-4=0$ (C) $y-4=0$ (D) $y+4=0$

(18) $x=a\cos\theta,\ y=b\sin\theta$ represent:- (A) Circle (B) Parabola (C) Ellipse (D) Hyperbola

(19) A unit vector perpendicular to the vectors $\underline{a}$ and $\underline{b}$ is:-

(A) $\frac{\underline{a}\times\underline{b}}{|\underline{a}||\underline{b}|}$ (B) $\frac{\underline{a}\times\underline{b}}{|\underline{a}\times\underline{b}|}$ (C) $\frac{|\underline{a}||\underline{b}|}{|\underline{a}\times\underline{b}|}$ (D) $\frac{|\underline{a}\times\underline{b}|}{|\underline{a}||\underline{b}|}$

(20) $\left[\hat{k}\ \hat{i}\ \hat{j}\right]=$ (A) 1 (B) 2 (C) -1 (D) -2

Paper Code Number: 4193	2018 (A) INTERMEDIATE PART-II (12th CLASS)	Roll No: _____

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

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

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Q.No.1

(1) Length of the diameter of the circle $(x+8)^2+(y-5)^2=80$ is:-

(A) 160 (B) $4\sqrt{5}$ (C) $8\sqrt{5}$ (D) 40

(2) Directrix of Parabola $x^2=-16y$ is:-

(A) $x+4=0$ (B) $x-4=0$ (C) $y-4=0$ (D) $y+4=0$

(3) $x=a\cos\theta,\quad y=b\sin\theta$ represent:- (A) Circle (B) Parabola (C) Ellipse (D) Hyperbola

(4) A unit vector perpendicular to the vectors $\underline{a}$ and $\underline{b}$ is:-

(A) $\dfrac{\underline{a}\times\underline{b}}{|\underline{a}||\underline{b}|}$ (B) $\dfrac{\underline{a}\times\underline{b}}{|\underline{a}\times\underline{b}|}$ (C) $\dfrac{|\underline{a}||\underline{b}|}{|\underline{a}\times\underline{b}|}$ (D) $\dfrac{|\underline{a}\times\underline{b}|}{|\underline{a}||\underline{b}|}$

(5) $\left[\hat{k}\ \hat{i}\ \hat{j}\right]=$ (A) 1 (B) 2 (C) -1 (D) -2

(6) $Log_e\left(\dfrac{1}{x}+\dfrac{\sqrt{1-x^2}}{x}\right)=$ --------, $\quad 0<x\le 1$

(A) $Sech^{-1}x$ (B) $Cosec\,h^{-1}x$ (C) $Tanh^{-1}x$ (D) $Coth^{-1}x$

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(8) If $y=e^{f(x)}$ then $y'=$

(A) $e^{f'(x)}.f(x)$ (B) $e^{f(x)}.f'(x)$ (C) $e^{f'(x)}.\log f(x)$ (D) $e^{f'(x)}.f'(x)$

(9) For relative maxima at $x=c$

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(11) $\dfrac{1}{2}\dfrac{d}{dx}\left[Tan^{-1}x-Cot^{-1}x\right]=$

(A) $\dfrac{-1}{1+x^2}$ (B) $\dfrac{1}{1+x^2}$ (C) $\dfrac{1}{1-x^2}$ (D) $\dfrac{-1}{1-x^2}$

(12) $\int\dfrac{\log_e Tanx}{Sin2x}.dx=$ (A) $\dfrac{1}{2}(\log_e(Tanx))^2+c$

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(14) $3\int_{\pi/2}^{\pi}Sinx.dx=$ (A) 1 (B) 2 (C) 3 (D) 4

(15) Solution of differential equation $(e^x+e^{-x})\dfrac{dy}{dx}=e^x-e^{-x}$ is $y=$

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(16) Distance of the point $(3,-7)$ from $x-$axis is:- (A) 3 (B) -3 (C) 7 (D) -7

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(20) The graph of $2x\ge 3$ lies in:-

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Paper Code Number: 4195	2018 (A)	Roll No: _____

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

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

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Q.No.1

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(2) Inclination of a line perpendicular to $y-$axis is:- (A) 0^o (B) 60^o (C) 30^o (D) 90^o

(3) The slope of a line which is perpendicular to the line $ax+by+c=0$ is:-

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(6) Length of the diameter of the circle $(x+8)^2+(y-5)^2=80$ is:-

(A) 160 (B) $4\sqrt{5}$ (C) $8\sqrt{5}$ (D) 40

(7) Directrix of Parabola $x^2=-16y$ is:-

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(8) $x=a\cos\theta,\quad y=b\sin\theta$ represent:- (A) Circle (B) Parabola (C) Ellipse (D) Hyperbola

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(10) $\left|\hat{k}\ \hat{i}\ \hat{j}\right| =$ (A) 1 (B) 2 (C) -1 (D) -2

(11) $Log_e\left(\frac{1}{x}+\frac{\sqrt{1-x^2}}{x}\right) =$ --------, $\quad 0<x\leq 1$

(A) $Sech^{-1}x$ (B) $Cosech^{-1}x$ (C) $Tanh^{-1}x$ (D) $Coth^{-1}x$

(12) The linear function $f(x)=ax+b$ becomes identity function if:-

(A) $a=0,\ b=1$ (B) $a=1,\ b=0$ (C) $a=0,\ b=0$ (D) $a=1,\ b=1$

(13) If $y=e^{f(x)}$ then $y'=$

(A) $e^{f'(x)}.f(x)$ (B) $e^{f(x)}.f'(x)$ (C) $e^{f'(x)}.\log f(x)$ (D) $e^{f'(x)}.f'(x)$

(14) For relative maxima at $x=c$

(A) $f(c)<f(x)$ (B) $f(c)>f(x)$ (C) $f(c)\geq f(x)$ (D) $f(c)\leq f(x)$

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(A) Relative Minima (B) Relative Maxima (C) Point of Inflexion (D) Critical Point

(16) $\frac{1}{2}\frac{d}{dx}\left[Tan^{-1}x-Cot^{-1}x\right] =$

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(17) $\int\frac{\log_e Tanx}{Sin2x}.dx =$ (A) $\frac{1}{2}(\log_e(Tanx))^2+c$

(B) $\frac{1}{4}(\log_e(Tanx))^2+c$ (C) $\frac{1}{2}\log_e(Sin2x)^2+c$ (D) $\frac{1}{4}\log_e(Sin2x)^2+c$

(18) $\int e^{-x}(Cosx-Sinx)\,dx =$

(A) $e^{-x}Sinx+c$ (B) $-e^{-x}Sinx+c$ (C) $e^{-x}Cosx+c$ (D) $-e^{-x}Cosx+c$

(19) $3\int_{\pi/2}^{\pi} Sinx.dx =$ (A) 1 (B) 2 (C) 3 (D) 4

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Paper Code Number: 4197	2018 (A) INTERMEDIATE PART-II (12th CLASS)	Roll No: _____

MATHEMATICS PAPER-II
GROUP-I

OBJECTIVE

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MAXIMUM MARKS: 20

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Q.No.1

(1) $\frac{1}{2}\frac{d}{dx}\left[Tan^{-1}x - Cot^{-1}x\right] =$

(A) $\frac{-1}{1+x^2}$ (B) $\frac{1}{1+x^2}$ (C) $\frac{1}{1-x^2}$ (D) $\frac{-1}{1-x^2}$

(2) $\int \frac{\log_e Tanx}{Sin2x}.dx =$ (A) $\frac{1}{2}(\log_e(Tanx))^2 + c$

(B) $\frac{1}{4}(\log_e(Tanx))^2 + c$ (C) $\frac{1}{2}\log_e(Sin2x)^2 + c$ (D) $\frac{1}{4}\log_e(Sin2x)^2 + c$

(3) $\int e^{-x}(Cosx - Sinx)\,dx =$

(A) $e^{-x}Sinx + c$ (B) $-e^{-x}Sinx + c$ (C) $e^{-x}Cosx + c$ (D) $-e^{-x}Cosx + c$

(4) $3\int_{\pi/2}^{\pi} Sinx.dx =$ (A) 1 (B) 2 (C) 3 (D) 4

(5) Solution of differential equation $(e^x + e^{-x})\frac{dy}{dx} = e^x - e^{-x}$ is $y =$

(A) $\log_a(e^x + e^{-x}) + c$ (B) $\log_e(e^x + e^{-x}) + c$ (C) $\log_a(e^x - e^{-x}) + c$ (D) $\log_e(e^x - e^{-x}) + c$

(6) Distance of the point $(3, -7)$ from $x-$axis is:- (A) 3 (B) -3 (C) 7 (D) -7

(7) Inclination of a line perpendicular to $y-$axis is:- (A) 0^o (B) 60^o (C) 30^o (D) 90^o

(8) The slope of a line which is perpendicular to the line $ax + by + c = 0$ is:-

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(9) The point of concurrency of altitudes of a triangle is called:-

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(10) The graph of $2x \geq 3$ lies in:-

(A) Upper Half Plane (B) Lower Half Plane (C) Left Half Plane (D) Right Half Plane

(11) Length of the diameter of the circle $(x+8)^2 + (y-5)^2 = 80$ is:-

(A) 160 (B) $4\sqrt{5}$ (C) $8\sqrt{5}$ (D) 40

(12) Directrix of Parabola $x^2 = -16y$ is:-

(A) $x + 4 = 0$ (B) $x - 4 = 0$ (C) $y - 4 = 0$ (D) $y + 4 = 0$

(13) $x = a\cos\theta,\quad y = b\sin\theta$ represent:- (A) Circle (B) Parabola (C) Ellipse (D) Hyperbola

(14) A unit vector perpendicular to the vectors $\underline{a}$ and $\underline{b}$ is:-

(A) $\frac{\underline{a}\times\underline{b}}{|\underline{a}||\underline{b}|}$ (B) $\frac{\underline{a}\times\underline{b}}{|\underline{a}\times\underline{b}|}$ (C) $\frac{|\underline{a}||\underline{b}|}{|\underline{a}\times\underline{b}|}$ (D) $\frac{|\underline{a}\times\underline{b}|}{|\underline{a}||\underline{b}|}$

(15) $\left|\hat{k}\ \hat{i}\ \hat{j}\right| =$ (A) 1 (B) 2 (C) -1 (D) -2

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(A) $Sech^{-1}x$ (B) $Cosech^{-1}x$ (C) $Tanh^{-1}x$ (D) $Coth^{-1}x$

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(A) $a = 0,\ b = 1$ (B) $a = 1,\ b = 0$ (C) $a = 0,\ b = 0$ (D) $a = 1,\ b = 1$

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(A) $f(c) < f(x)$ (B) $f(c) > f(x)$ (C) $f(c) \geq f(x)$ (D) $f(c) \leq f(x)$

(20) If $f'(a-\varepsilon) < 0$ and $f'(a+\varepsilon) < 0$ then at $x = a$ $f(x)$ has:-

(A) Relative Minima (B) Relative Maxima (C) Point of Inflexion (D) Critical Point

2018 (A) Roll No: _____

INTERMEDIATE PART-II (12th 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) Evaluate $\lim_{x \to 0} \frac{\sqrt{x+a} - \sqrt{a}}{x}$

(ii) Express $\lim_{n \to \infty} \left(1 + \frac{3}{n}\right)^{2n}$ in terms of number "e".

(iii) Give three conditions for a function $f(x)$ to be continuous at a number 'C'.

(iv) Write any two different notations for the derivative of a function $f(x)$.

(v) Find derivative of $\frac{1}{(az-b)^7}$ w.r.t. z using power rule.

(vi) Differentiate $\frac{x^2+1}{x^2-3}$ w.r.t. x

(vii) If $y = \sqrt{x} - \frac{1}{\sqrt{x}}$. Show that $2x\frac{dy}{dx} + y = 2\sqrt{x}$

(viii) Find the first derivative of implicit function $y^2 + x^2 - 4x = 5$

(ix) Differentiate x and y w.r.t. 't' if $x = \frac{1-t^2}{1+t^2}$, $y = \frac{2t}{1+t^2}$

(x) Differentiate $Sin^2 x$ w.r.t. $Cos^4 x$

(xi) If $x = aCos^3\theta$, $y = bSin^3\theta$, then show that $a\frac{dy}{dx} + b\tan\theta = 0$

(xii) Find $\frac{dy}{dx}$ if $y = \ell n(\tanh x)$

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

(i) Find δy and dy when $y = x^2 + 2x$ when x changes from 2 to 1.8.

(ii) Evaluate $\int \frac{e^{2x} + e^x}{e^x}\, dx$

(iii) Evaluate $\int \frac{ax+b}{ax^2 + 2bx + c}\, dx$

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

(v) Evaluate $\int \frac{1}{x\,\ell n\, x}\, dx$

(vi) Evaluate $\int x\cos x\, dx$

(vii) Evaluate $\int_1^2 \ell n\, x\, dx$

(viii) Evaluate $\int e^x(Cosx + Sinx)\, dx$

(ix) Evaluate $\int Tan^{-1}x\, dx$

(x) Find the area bounded by the curve $y = x^3 + 3x^2$ and the $x-$axis.

(xi) Define feasible solution set.

(xii) Graph the inequality $x + 2y < 6$

P.T.O.

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

(i) Prove that $A(3, 1)$, $B(-2, -3)$ and $C(2, 2)$ are vertices of an isosceles triangle.

(ii) If origin is translated to $O'(-3, 2)$ find new coordinates of $P(-2, 6)$.

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

(iv) Find equation of line whose slope is -4 and $x-$intercept is -9.

(v) Find equation of each line represented by $20x^2 + 17xy - 24y^2 = 0$

(vi) Find focus, directrix of parabola $y = 6x^2 - 1$

(vii) Find equation of parabola if its focus is (2, 5), directrix $y = 1$

(viii) Find centre and vertices of ellipse $\frac{(2x-1)^2}{16} + \frac{(y+2)^2}{16} = 1$

(ix) Find equation of ellipse with centre (0, 0) focus (0, -3), vertex (0, 4)

(x) Find direction cosine of $\overline{PQ}$ if $P(2, 1, 5)$, $Q(1, 3, 1)$

(xi) Find unit vector in the direction of the vector $\underline{V} = 2\underline{i} + 6\underline{j}$.

(xii) A force $\underline{F} = 4\underline{i} - 3\underline{k}$, passes through the point $A(2, -2, 5)$.
Find the moment of $\underline{F}$ about point $B(1, -3, 1)$

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

SECTION-II

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

5.(a) $f(x) = \begin{cases} \dfrac{\sqrt{2x+5} - \sqrt{x+7}}{x-2} & \text{if} \quad x \neq 2 \\ k & \text{if} \quad x = 2 \end{cases}$

Find the value of k so that the function is continuous at $x = 2$.

(b) If $y = e^{ax} \sin bx$, show that $\frac{d^2y}{dx^2} - 2a\frac{dy}{dx} + (a^2 + b^2)y = 0$

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

(b) The vertices of a triangle are $A(-2, 3)$, $B(-4, 1)$ and $C(3, 5)$. Find coordinates of the centroid of the triangle.

7. (a) Find the area bounded by the curve $y = x^3 - 4x$ and the $x-$axis.

(b) Maximize $z = 2x + 3y$ subject to the constraints
$3x + 4y \leq 12$; $2x + y \leq 4$; $4x - y \leq 4$; $x \geq 0$; $y \geq 0$

8. (a) Write an equation of the circle that passes through the given points. $A(4, 5)$, $B(-4, -3)$, $C(8, -3)$

(b) Prove that $Cos(\alpha + \beta) = Cos\,\alpha\, Cos\beta - Sin\alpha\, Sin\beta$

9.(a) Find the center, Foci, Eccentricity vertices and equation of directrices of $x^2 - y^2 = 9$

(b) Find the volume of tetrahedron whose vertices are $A(2, 1, 8)$, $B(3, 2, 9)$, $C(2, 1, 4)$ and $D(3, 3, 0)$

Paper Code Number: 4192	2018 (A) INTERMEDIATE PART-II (12th CLASS)	Roll No: _____

MATHEMATICS PAPER-II
GROUP-II

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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) If $g(x) = \frac{3}{x-1}$, then $gog(4) =$ (A) 3 (B) 1 (C) Undefined (D) 0

(2) $\lim_{\theta \to 0} \frac{Sin7\theta}{\theta} =$ (A) 0 (B) Undefined (C) 1 (D) 7

(3) $\frac{d}{dx}\left(Cos^{-1}3x\right) =$ (A) $\frac{3}{\sqrt{1-9x^2}}$ (B) $\frac{-3}{\sqrt{1-9x^2}}$ (C) $\frac{1}{\sqrt{1-9x^2}}$ (D) $\frac{-1}{\sqrt{1-9x^2}}$

(4) $\frac{d}{dx}\ e^{5x-2} =$ (A) $5e^{5x-2}$ (B) $2e^{5x-2}$ (C) e^{5x-3} (D) $5e^{5x-3}$

(5) $\frac{d^2}{dx^2}\left(Cos\,h3x\right) =$ (A) $3\cos h3x$ (B) $3\sin h3x$ (C) $-9\cos h3x$ (D) $9\cos h3x$

(6) $\frac{d}{dx}\left(\cot^{-1}\frac{x}{a}\right) =$ (A) $\frac{a}{a^2+x^2}$ (B) $\frac{a^2}{a^2+x^2}$ (C) $\frac{-a}{a^2+x^2}$ (D) $\frac{-1}{a^2+x^2}$

(7) $\int \frac{1}{ax+b}\,dx =$

(A) $\ell n(ax+b)+c$ (B) $\frac{1}{a}\ell n(ax+b)+c$ (C) $\frac{1}{b}\ell n(ax+b)+c$ (D) $a\ell n(ax+b)+c$

(8) $\int e^x\left(\frac{1}{x}+\ell nx\right)dx =$ (A) $e^x\,\ell nx+c$ (B) $\frac{1}{x}e^x+c$ (C) e^x+c (D) $\ell nx+c$

(9) $\int_0^{\pi} Cos\,x\,dx =$ (A) π (B) 2 (C) 1 (D) 0

(10) $\int_2^4 \frac{1}{x}\,dx =$ (A) $\ell n4$ (B) 4 (C) $\ell n2$ (D) 2

(11) Distance between points (7, 6) and (3, 3) is:- (A) 3 (B) 5 (C) 6 (D) 7

(12) If two lines with slopes m_1, m_2 are parallel then:-

(A) $m_1 = m_2$ (B) $m_1 = -m_2$ (C) $\frac{m_1}{m_2} = 2$ (D) $\frac{m_1}{m_2} = -1$

(13) Slope of line $5x + 7y = 35$ is:- (A) $\frac{5}{7}$ (B) $\frac{7}{5}$ (C) 35 (D) $\frac{-5}{7}$

(14) Equation of line with slope -2, y – intercept 3 is:-
(A) $x - 2y = 3$ (B) $3x + 2y = 2$ (C) $2x + y = 3$ (D) $x + 3y = 2$

(15) _____ point satisfy $x - y < 2$.
(A) (3, 1) (B) (−1, 1) (C) (1, −1) (D) (0, −2)

(16) Centre of circle $x^2 + y^2 - 6x + 4y + 13 = 0$ is:-
(A) (3, −2) (B) (−3, −2) (C) (−3, 2) (D) (3, 2)

(17) Equation of directrix of $y^2 = -4ax$ is:-
(A) $y = -a$ (B) $y = a$ (C) $x = -a$ (D) $x = a$

(18) Focus of $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is:- (A) (±4, 0) (B) (±5, 0) (C) (0, ±3) (D) (±3, 0)

(19) $2\underline{i} \times 2\underline{j} \,.\, \underline{k} =$ (A) 2 (B) 4 (C) 0 (D) 6

(20) For a vector $\underline{v} = 2\underline{i} + 3\underline{j} - 6\underline{k}$, $Cos\beta =$ (A) $\frac{-6}{7}$ (B) $\frac{2}{7}$ (C) $\frac{3}{7}$ (D) $\frac{-3}{7}$

Paper Code Number: 4194	2018 (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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) Centre of circle $x^2 + y^2 - 6x + 4y + 13 = 0$ is:-

(A) $(3, -2)$ (B) $(-3, -2)$ (C) $(-3, 2)$ (D) $(3, 2)$

(2) Equation of directrix of $y^2 = -4ax$ is:-

(A) $y = -a$ (B) $y = a$ (C) $x = -a$ (D) $x = a$

(3) Focus of $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is:- (A) $(\pm 4, 0)$ (B) $(\pm 5, 0)$ (C) $(0, \pm 3)$ (D) $(\pm 3, 0)$

(4) $2\underline{i} \times 2\underline{j} \,.\, \underline{k} =$ (A) 2 (B) 4 (C) 0 (D) 6

(5) For a vector $\underline{v} = 2\underline{i} + 3\underline{j} - 6\underline{k}$, $Cos\beta =$ (A) $\frac{-6}{7}$ (B) $\frac{2}{7}$ (C) $\frac{3}{7}$ (D) $\frac{-3}{7}$

(6) If $g(x) = \frac{3}{x-1}$, then $gog(4) =$ (A) 3 (B) 1 (C) Undefined (D) 0

(7) $\lim_{\theta \to 0} \frac{Sin7\theta}{\theta} =$ (A) 0 (B) Undefined (C) 1 (D) 7

(8) $\frac{d}{dx}\left(Cos^{-1} 3x\right) =$ (A) $\frac{3}{\sqrt{1-9x^2}}$ (B) $\frac{-3}{\sqrt{1-9x^2}}$ (C) $\frac{1}{\sqrt{1-9x^2}}$ (D) $\frac{-1}{\sqrt{1-9x^2}}$

(9) $\frac{d}{dx}\, e^{5x-2} =$ (A) $5e^{5x-2}$ (B) $2e^{5x-2}$ (C) e^{5x-3} (D) $5e^{5x-3}$

(10) $\frac{d^2}{dx^2}\left(Cos\,h3x\right) =$ (A) $3\cos h3x$ (B) $3\sin h3x$ (C) $-9\cos h3x$ (D) $9\cos h3x$

(11) $\frac{d}{dx}\left(\cot^{-1}\frac{x}{a}\right) =$ (A) $\frac{a}{a^2+x^2}$ (B) $\frac{a^2}{a^2+x^2}$ (C) $\frac{-a}{a^2+x^2}$ (D) $\frac{-1}{a^2+x^2}$

(12) $\int \frac{1}{ax+b}\, dx =$

(A) $\ell n(ax+b) + c$ (B) $\frac{1}{a}\ell n(ax+b) + c$ (C) $\frac{1}{b}\ell n(ax+b) + c$ (D) $a\ell n(ax+b) + c$

(13) $\int e^x \left(\frac{1}{x} + \ell nx\right) dx =$ (A) $e^x \ell nx + c$ (B) $\frac{1}{x}e^x + c$ (C) $e^x + c$ (D) $\ell nx + c$

(14) $\int_0^{\pi} Cos\,x\, dx =$ (A) π (B) 2 (C) 1 (D) 0

(15) $\int_2^4 \frac{1}{x}\, dx =$ (A) $\ell n4$ (B) 4 (C) $\ell n2$ (D) 2

(16) Distance between points (7, 6) and (3, 3) is:- (A) 3 (B) 5 (C) 6 (D) 7

(17) If two lines with slopes m_1, m_2 are parallel then:-

(A) $m_1 = m_2$ (B) $m_1 = -m_2$ (C) $\frac{m_1}{m_2} = 2$ (D) $\frac{m_1}{m_2} = -1$

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(19) Equation of line with slope -2, y – intercept 3 is:-

(A) $x - 2y = 3$ (B) $3x + 2y = 2$ (C) $2x + y = 3$ (D) $x + 3y = 2$

(20) _____ point satisfy $x - y < 2$.

(A) $(3, 1)$ (B) $(-1, 1)$ (C) $(1, -1)$ (D) $(0, -2)$

Paper Code Number: 4196	2018 (A) INTERMEDIATE PART-II (12th CLASS)	Roll No: _____

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

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

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Q.No.1

(1) Distance between points (7, 6) and (3, 3) is:- (A) 3 (B) 5 (C) 6 (D) 7

(2) If two lines with slopes m_1, m_2 are parallel then:-

(A) $m_1 = m_2$ (B) $m_1 = -m_2$ (C) $\frac{m_1}{m_2} = 2$ (D) $\frac{m_1}{m_2} = -1$

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(4) Equation of line with slope -2, y – intercept 3 is:-

(A) $x - 2y = 3$ (B) $3x + 2y = 2$ (C) $2x + y = 3$ (D) $x + 3y = 2$

(5) _____ point satisfy $x - y < 2$.

(A) (3, 1) (B) (–1, 1) (C) (1, –1) (D) (0, –2)

(6) Centre of circle $x^2 + y^2 - 6x + 4y + 13 = 0$ is:-

(A) (3, –2) (B) (–3, –2) (C) (–3, 2) (D) (3, 2)

(7) Equation of directrix of $y^2 = -4ax$ is:-

(A) $y = -a$ (B) $y = a$ (C) $x = -a$ (D) $x = a$

(8) Focus of $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is:- (A) $(\pm 4, 0)$ (B) $(\pm 5, 0)$ (C) $(0, \pm 3)$ (D) $(\pm 3, 0)$

(9) $2\underline{i} \times 2\underline{j} \,.\, \underline{k} =$ (A) 2 (B) 4 (C) 0 (D) 6

(10) For a vector $\underline{v} = 2\underline{i} + 3\underline{j} - 6\underline{k}$, $Cos\beta =$ (A) $\frac{-6}{7}$ (B) $\frac{2}{7}$ (C) $\frac{3}{7}$ (D) $\frac{-3}{7}$

(11) If $g(x) = \frac{3}{x-1}$, then $gog(4) =$ (A) 3 (B) 1 (C) Undefined (D) 0

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(15) $\frac{d^2}{dx^2}\left(Cosh3x\right) =$ (A) $3\cosh 3x$ (B) $3\sinh 3x$ (C) $-9\cosh 3x$ (D) $9\cosh 3x$

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(19) $\int_0^{\pi} Cos\, x\, dx =$ (A) π (B) 2 (C) 1 (D) 0

(20) $\int_2^4 \frac{1}{x}\, dx =$ (A) $\ell n4$ (B) 4 (C) $\ell n2$ (D) 2

Paper Code Number: 4198	2018 (A) **INTERMEDIATE PART-II (12th CLASS)**	Roll No: _____

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

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

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Q.No.1

(1) $\frac{d}{dx}\left(\cot^{-1}\frac{x}{a}\right) =$ (A) $\frac{a}{a^2+x^2}$ (B) $\frac{a^2}{a^2+x^2}$ (C) $\frac{-a}{a^2+x^2}$ (D) $\frac{-1}{a^2+x^2}$

(2) $\int \frac{1}{ax+b}\,dx =$

(A) $\ell n(ax+b)+c$ (B) $\frac{1}{a}\ell n(ax+b)+c$ (C) $\frac{1}{b}\ell n(ax+b)+c$ (D) $a\ell n(ax+b)+c$

(3) $\int e^x\left(\frac{1}{x}+\ell nx\right)dx =$ (A) $e^x\,\ell nx+c$ (B) $\frac{1}{x}e^x+c$ (C) e^x+c (D) $\ell nx+c$

(4) $\int_0^{\pi} Cos\,x\,dx =$ (A) π (B) 2 (C) 1 (D) 0

(5) $\int_2^4 \frac{1}{x}\,dx =$ (A) $\ell n4$ (B) 4 (C) $\ell n2$ (D) 2

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(7) If two lines with slopes m_1, m_2 are parallel then:-

(A) $m_1 = m_2$ (B) $m_1 = -m_2$ (C) $\frac{m_1}{m_2} = 2$ (D) $\frac{m_1}{m_2} = -1$

(8) Slope of line $5x + 7y = 35$ is:- (A) $\frac{5}{7}$ (B) $\frac{7}{5}$ (C) 35 (D) $\frac{-5}{7}$

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(A) (3, 1) (B) (−1, 1) (C) (1, −1) (D) (0, −2)

(11) Centre of circle $x^2 + y^2 - 6x + 4y + 13 = 0$ is:-

(A) (3, −2) (B) (−3, −2) (C) (−3, 2) (D) (3, 2)

(12) Equation of directrix of $y^2 = -4ax$ is:-

(A) $y = -a$ (B) $y = a$ (C) $x = -a$ (D) $x = a$

(13) Focus of $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is:- (A) $(\pm 4, 0)$ (B) $(\pm 5, 0)$ (C) $(0, \pm 3)$ (D) $(\pm 3, 0)$

(14) $2\underline{i} \times 2\underline{j} \,.\, \underline{k} =$ (A) 2 (B) 4 (C) 0 (D) 6

(15) For a vector $\underline{v} = 2\underline{i} + 3\underline{j} - 6\underline{k}$, $Cos\beta =$ (A) $\frac{-6}{7}$ (B) $\frac{2}{7}$ (C) $\frac{3}{7}$ (D) $\frac{-3}{7}$

(16) If $g(x) = \frac{3}{x-1}$, then $gog(4) =$ (A) 3 (B) 1 (C) Undefined (D) 0

(17) $\lim_{\theta \to 0} \frac{Sin7\theta}{\theta} =$ (A) 0 (B) Undefined (C) 1 (D) 7

(18) $\frac{d}{dx}\left(Cos^{-1}3x\right) =$ (A) $\frac{3}{\sqrt{1-9x^2}}$ (B) $\frac{-3}{\sqrt{1-9x^2}}$ (C) $\frac{1}{\sqrt{1-9x^2}}$ (D) $\frac{-1}{\sqrt{1-9x^2}}$

(19) $\frac{d}{dx}\,e^{5x-2} =$ (A) $5e^{5x-2}$ (B) $2e^{5x-2}$ (C) e^{5x-3} (D) $5e^{5x-3}$

(20) $\frac{d^2}{dx^2}\left(Cos\,h3x\right) =$ (A) $3\cos h3x$ (B) $3\sin h3x$ (C) $-9\cos h3x$ (D) $9\cos h3x$

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION,MULTAN
OBJECTIVE KEY FOR INTERMEDIATE ANNUAL/SUPPLY EXAMINATION,2018

Name of Subject: Mathematics Session: _____

Group : 1st Group: 2nd

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

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

سرٹیفکیٹ بابت صحیح سوالیہ پرچہ/مارکنگ Key

ہم نے مضمون ریاضی پرچہ ریاضی (ایڈوانس) گروپ I/II سکیم نیو انٹرسالانہ/ضمنی امتحان 2018 کا سوالیہ پرچہ انشائیہ ومعروضی (Subjective & Objective) کو بنظر عمیق چیک کرلیا ہے یہ پرچہ Syllabus کے عین مطابق Set کیا گیا ہے۔ اس سوالیہ پرچہ میں کسی قسم کی کوئی غلطی نہ ہے۔ ہم نے سوالیہ پرچہ کا اردو اور انگریزی Version بھی چیک کرلیا ہے۔ یہ Version آپس میں مطابقت رکھتے ہیں۔ نیز اس پرچہ کی معروضی (MCQs) Key کی بابت تصدیق کی جاتی ہے کہ اس میں بھی کسی قسم کی کوئی غلطی نہ ہے۔ مزید یہ کہ ہم نے Key بنانے سے متعلق دفتر کی جانب سے تیار کردہ ہدایات وصول کرکے ان کا بغور مطالعہ کرلیا ہے اور ان کی روشنی میں Key بنائی ہے۔ نیز سب ایگزامینرز کیلئے تفصیلی مارکنگ ہدایات/ مارکنگ سکیم/Rubrics بھی تیار کر دی گئی ہیں۔

Prepared & Checked By: **Dated:** 18/05/2018

S.#	Name	Designation	Institution	Mobile No	Signature
1	Kausar Ali Tulmi	Asso. Prof.	Govt Millat College mulin	0300-6510675	
2	Muhammad Iqbal (R)	Asso. Prof	Govt. College of Sc Mult	0301-7553646	
3	Muhammad Yousaf	Asso Prof.	Govt. College civil lines mult	0332-6008633	
4	Noorullah.	A-P	Govt Emerson college MLT	0333 7649118	
5					

Re-Checked By ہم نے درج بالا سوالیہ پرچہ (انشائیہ + معروضی)، معروضی "Key" اور ہدایات کے حوالہ سے مکمل طور پر تسلی کرلی ہے۔ کسی قسم کی کوئی غلطی نہ ہے۔

1	Javed Iqbal Ansari	Asso. Prof	G. E. C. Multan	0340 6364668	
2	Fayyaz Hussain	Assistant Prof	Co. M. H. SBI Multan	0300-5865049	

19-5-2018 تاریخ

ثانوی و اعلیٰ ثانوی تعلیمی بورڈ، ملتان

مورخہ: 18/5/18 مضمون: ریاضی پرچہ: II گروپ: I

جنرل ہدایات برائے مارکنگ Key اولڈ سکیم / نیو سکیم (مارکنگ سکیم)

انٹر پارٹ فرسٹ / سیکنڈ سالانہ / ضمنی امتحان 2018ء

Sr #	Code	Error Indicated	Sr #	Code	Error Indicated
1.	UN	Un-Necessary	8.	Sp	Spelling Error
2.	Ir	Irrelevant	9.	P	Punctuation
3.	IN	Incomplete	10.	Wo	Wrong word error
4.	EX	Extra	11.	Wt	Wrong Tense
5.	Rp	Re-Produced	12.	Wf	Wrong Form
6.	Is	Insufficient	13.	OA	Over Attempt
7.	Gr	Grammar Error			

اہم نوٹ: ہر سوال "Full Award" سے کم نمبر لگانے کی صورت میں وجہ ضرور لکھیں۔

Section - 1

(i) Definition ——— 1m + e.g ——— 1M

(ii) $f(x) = \cos x$, $\frac{f(a+h)-f(a)}{h} = \frac{\cos(a+h)-\cos a}{h}$ 1M

$= \frac{-2\sin\left(\frac{a+h+a}{2}\right)\sin\left(\frac{a+h-a}{2}\right)}{h}$

$= \frac{-2\sin\left(a+\frac{h}{2}\right)\sin\frac{h}{2}}{h}$ 1M

(iii) $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = e$

$L.H.S = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n = \lim_{n\to\infty}\left(1+n\cdot\frac{1}{n}+\frac{n(n-1)}{2!}\frac{1}{n^2}\right.$

$\left.+\frac{n(n-1)(n-2)}{3!}\cdot\frac{1}{n^3}+\cdots\infty\right)$ 1M

$= \lim_{n\to\infty}\left(1+1+\frac{n^2\left(1-\frac{1}{n}\right)\cdot\frac{1}{n^2}}{2!}+\frac{n^3\left(1-\frac{1}{n}\right)\left(1-\frac{2}{n}\right)}{3!}\cdot\frac{1}{n^3}+\cdots\right)$

$= 1+1+\frac{1}{2!}(1)+\frac{1}{3!}+\frac{1}{4!}+\cdots$ apply limit

$= e = R.H.S$ 1M

(iii) Let $y = 2-\sqrt{x} \Rightarrow y+\delta y = 2-\sqrt{x+\delta x}$

$\delta y = 2-\sqrt{x+\delta x}-2+\sqrt{x} = \sqrt{x}-\sqrt{x+\delta x}$

$= \frac{(\sqrt{x}-\sqrt{x+\delta x})(\sqrt{x}+\sqrt{x+\delta x})}{\sqrt{x}+\sqrt{x+\delta x}} = \frac{x-(x+\delta x)}{\sqrt{x}+\sqrt{x+\delta x}}$ 1M

$\frac{\delta y}{\delta x} = \frac{-\delta x}{\sqrt{x}+\sqrt{x+\delta x}} \times \frac{1}{\delta x} = \frac{-1}{\sqrt{x}+\sqrt{x+\delta x}}$ 1M