Paper Code Number: 4191

2018 (A) Roll No: _____

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II TIME ALLOWED: 30 Minutes

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

(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) $\frac{1}{2}(\log_e(Tanx))^2+c$

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

(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

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

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

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

(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 $\int_1^2 \frac{x dx}{x^2+2}$

(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.

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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) $\frac{m_1}{m_2} = -1$

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

(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

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

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

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

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

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

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

(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) $a\ell n(ax+b) + c$

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

(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

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

(ii) Express $\lim\limits_{n \to \infty} \left(1 + \dfrac{3}{n}\right)^{2n}$ 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 $\dfrac{1}{(az-b)^7}$ w.r.t. z using power rule.

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

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

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

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

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

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

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

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

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

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

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

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

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

(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.