29 11/21

2021 Roll No: _____

INTERMEDIATE PART-II (12th CLASS) (SPECIAL EXAMINATION)

MATHEMATICS PAPER-II TIME ALLOWED: 2.30 Hours

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) Find domain and range of $f^{-1}(x)$ if $f(x) = \sqrt{x+2}$

(ii) Evaluate $\lim_{x \to 0} \frac{\sin ax}{\sin bx}$

(iii) Evaluate $\lim_{h \to 0} (1-2h)^{1/h}$

(iv) Find $\frac{f(a+h) - f(a)}{h}$ if $f(x) = \cos x$

(v) find derivative of $\frac{1}{\sqrt{x}}$ by definition.

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

(vii) Differentiate $x^2 - \frac{1}{x^2}$ w.r.t. x^4.

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

(ix) Find $\frac{dy}{dx}$ if $y = x^2 \ell n \frac{1}{x}$

(x) Find y_2 if $y = \sqrt{x} + \frac{1}{\sqrt{x}}$

(xi) Differentiate $\sin^{-1}\sqrt{1-x^2}$ w.r.t. x

(xii) Determine the intervals in which f is increasing or decreasing if $f(x) = \cos x \quad x \in (-\pi/2, \pi/2)$

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

(i) Use differentials to approximate the value of $(31)^{\frac{1}{5}}$

(ii) Evaluate $\int \frac{(1-\sqrt{x})^2}{\sqrt{x}} dx$

(iii) Evaluate $\int \frac{\sin\theta}{1+\cos^2\theta} d\theta$

(iv) Evaluate $\int \tan^{-1} x \, dx$

(v) Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos t \, dt$

(vi) Find area bounded by the curve $y = x^3 + 1$, the $x-$axis and line $x = 2$

(vii) Evaluate $\int e^x \left(\frac{1}{x} + \ell nx \right) dx$

(viii) Evaluate $\int \frac{(a-b)x}{(x-a)(x-b)} dx \quad (a > b)$

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

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

(xi) Transform the equation $5x - 12y + 39 = 0$ into (i) slope-intercept form (ii) two-intercept form.

(xii) Find distance and mid point of the join of $A(-8, 3)$, $B(2, -1)$

P.T.O.

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

(i) Graph the solution set of $5x - 4y \leq 20$

(ii) Find the centre of $4x^2 + 4y^2 - 8x + 12y - 25 = 0$

(iii) Find an equation of the circle with ends of a diameter at $(-3, 2)$ and $(5, -6)$.

(iv) Find the equation of normal to the circle $x^2 + y^2 = 25$ at $(4, 3)$

(v) Find directrix at parabola $x^2 = 4(y - 1)$.

(vi) Write equation of parabola with focus $(-3, 1)$ and directrix $x = 3$

(vii) Find the magnitude of the vector $\underline{u} = 2\underline{i} - 7\underline{j}$

(viii) Find a unit vector in direction of the vector $\underline{v} = 2\underline{i} - \underline{j}$

(ix) Find $|3\underline{v} + \underline{w}|$ for $\underline{v} = 3\underline{i} - 2\underline{j} + 2\underline{k}$, $\underline{w} = 5\underline{i} - \underline{j} + 3\underline{k}$

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

(xi) Find a vector whose magnitude is '4' and is parallel to $2\underline{i} - 3\underline{j} + 6\underline{k}$.

(xii) If $\underline{a} + \underline{b} + \underline{c} = 0$, then prove that $\underline{a} \times \underline{b} = \underline{b} \times \underline{c} = \underline{c} \times \underline{a}$

(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) If $f(x) = \begin{cases} \dfrac{\sqrt{2x+5} - \sqrt{x+7}}{x-2} & ; \quad x \neq 2 \\ k & ; \quad x = 2 \end{cases}$ Find value of k so that f is continuous at $x = 2$

(b) Differentiate $Sec^{-1}\left(\dfrac{x^2+1}{x^2-1}\right)$ w.r.t. x.

6.(a) Evaluate $\displaystyle\int \frac{xe^x}{(1+x)^2}\,dx$

(b) Find equations of two parallel lines perpendicular to $2x - y + 3 = 0$ such that the product of the $x-$ and $y-$ intercepts of each is 3.

7. (a) Find the area between the $x-$axis and the curve $y = 4x - x^2$.

(b) Graph the feasible region of the following system of linear inequalities and find the corner points
$2x - 3y \leq 6$, $2x + 3y \leq 12$, $x \geq 0$, $y \geq 0$

8. (a) Write an equation of the circle that passes through $A(5, 6)$, $B(-3, 2)$, $C(3, -4)$

(b) If $\overrightarrow{AB} = \overrightarrow{CD}$, find the co-ordinates of the point 'A' when points B, C, D are $(1, 2)$, $(-2, 5)$ and $(4, 11)$ respectively.

9.(a) Show that $\cos(x + h) = \cos x - h\sin x - \dfrac{h^2}{2!}\cos x + \dfrac{h^3}{3!}\sin x + ----$

(b) Find the eccentricity, the coordinates of the vertices and foci of the asymptotes of the hyperbola.
$\dfrac{y^2}{16} - \dfrac{x^2}{49} = 1$

Paper Code Number: 4191

2021 Roll No: _____

INTERMEDIATE PART-II (12th CLASS) (SPECIAL EXAMINATION)

MATHEMATICS PAPER-II

TIME ALLOWED: 30 Minutes

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, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. 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 $g(x)=\frac{1}{x^2}$, $(x\neq 0)$ then $gog(x)=$_____ (A) 1 (B) x^2 (C) x^4 (D) $1/x^4$

(2) The function $f(x)=\frac{3x}{x^2+1}$ is _____ function.

(A) Even (B) Odd (C) Both even and odd (D) Neither even nor odd

(3) If $y=\sinh 2x$, then $\frac{dy}{dx}=$ _____

(A) $2\cosh 2x$ (B) $-2\cosh 2x$ (C) $\cosh 2x$ (D) $-\cosh 2x$

(4) $\frac{d}{dx}(\sqrt{x+2})=$ _____

(A) $\frac{1}{2}(x+2)^{3/2}$ (B) $\frac{1}{2\sqrt{x+2}}$ (C) $\frac{2}{3}(x+2)^{3/2}$ (D) $\frac{1}{2\sqrt{x+2}}$

(5) $\frac{d}{dx}(e^{2\sqrt{x}})=$ _____ (A) $2e^{2\sqrt{x}}$ (B) $e^{2\sqrt{x}}/2\sqrt{x}$ (C) $e^{2\sqrt{x}}/\sqrt{x}$ (D) $e^{2\sqrt{x}}/2$

(6) $1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+----$ is Maclaurin series of: (A) $\sin x$ (B) $\cos x$ (C) ℓnx (D) e^x

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

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

(9) $\int\sin x\cos x\,dx=$ _____

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

(10) $\int xe^x dx=$ _____

(A) xe^x-e^x+c (B) e^x-xe^x+c (C) e^x+x+c (D) e^x-x+c

(11) Intercept form of equation of line is:

(A) $\frac{x}{a}+\frac{y}{b}=0$ (B) $\frac{x}{a}+\frac{y}{b}=1$ (C) $y=mx+c$ (D) $y-y_1=m(x-x_1)$

(12) The distance of a point $(3, 7)$ from $x-$axis is: (A) -3 (B) 3 (C) -7 (D) 7

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

(14) $(3, 2)$ is not solution of the inequality:

(A) $x+y>2$ (B) $x-y>1$ (C) $3x+7y>7$ (D) $3x-7y<3$

(15) The centre of circle $(x-1)^2+(y+3)^2=3$ is:

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

(16) The focus of parabola $y^2=4ax$ is:

(A) $(0, a)$ (B) $(0,-a)$ (C) $(a, 0)$ (D) $(-a, 0)$

(17) The radius of circle $x^2+y^2+2gx+2fy+c=0$ is:

(A) $\sqrt{g^2+f^2+c}$ (B) $\sqrt{g^2-f^2-c}$ (C) $\sqrt{f^2-g^2-c}$ (D) $\sqrt{g^2+f^2-c}$

(18) $2\underline{j}\cdot(2\underline{k}\times\underline{i})$ is equal to: (A) 0 (B) -4 (C) 4 (D) 1

(19) The direction cosines of $\underline{u}=\underline{i}+\underline{j}+\underline{k}$ are:

(A) $\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}}$ (B) $-\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}}$ (C) $\frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}},-\frac{1}{\sqrt{3}}$

(20) If $5\underline{i}-\underline{j}+\underline{k}$ and $\alpha\underline{i}+3\underline{j}-3\underline{k}$ are parallel then $\alpha=?$ (A) -3 (B) -15 (C) 15 (D) 3

Paper Code Number: 4193

2021 Roll No: _____

INTERMEDIATE PART-II (12th CLASS) (SPECIAL EXAMINATION)

MATHEMATICS PAPER-II

TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

(1) The radius of circle $x^2 + y^2 + 2gx + 2fy + c = 0$ is:

(A) $\sqrt{g^2 + f^2 + c}$ (B) $\sqrt{g^2 - f^2 - c}$ (C) $\sqrt{f^2 - g^2 - c}$ (D) $\sqrt{g^2 + f^2 - c}$

(2) $2\underline{j} \cdot (2\underline{k} \times \underline{i})$ is equal to: (A) 0 (B) -4 (C) 4 (D) 1

(3) The direction cosines of $\underline{u} = \underline{i} + \underline{j} + \underline{k}$ are:

(A) $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (B) $-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (C) $\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}$

(4) If $5\underline{i} - \underline{j} + \underline{k}$ and $\alpha\underline{i} + 3\underline{j} - 3\underline{k}$ are parallel then $\alpha = ?$ (A) -3 (B) -15 (C) 15 (D) 3

(5) If $g(x) = \frac{1}{x^2}$, $(x \neq 0)$ then $gog(x) =$ _____ (A) 1 (B) x^2 (C) x^4 (D) $1/x^4$

(6) The function $f(x) = \frac{3x}{x^2 + 1}$ is _____ function.

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(10) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ----$ is Maclaurin series of: (A) $\sin x$ (B) $\cos x$ (C) ℓnx (D) e^x

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(19) The centre of circle $(x-1)^2 + (y+3)^2 = 3$ is:

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

(20) The focus of parabola $y^2 = 4ax$ is:

(A) $(0, a)$ (B) $(0, -a)$ (C) $(a, 0)$ (D) $(-a, 0)$

Paper Code Number: 4195 | 2021 | Roll No: _____

INTERMEDIATE PART-II (12th CLASS) (SPECIAL EXAMINATION)

MATHEMATICS PAPER-II

TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

(1) $\int \sin x \cos x \, dx =$ _____

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

(2) $\int x e^x dx =$ _____

(A) $xe^x - e^x + c$ (B) $e^x - xe^x + c$ (C) $e^x + x + c$ (D) $e^x - x + c$

(3) Intercept form of equation of line is:

(A) $\frac{x}{a} + \frac{y}{b} = 0$ (B) $\frac{x}{a} + \frac{y}{b} = 1$ (C) $y = mx + c$ (D) $y - y_1 = m(x - x_1)$

(4) The distance of a point $(3, 7)$ from $x-$axis is: (A) -3 (B) 3 (C) -7 (D) 7

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

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(11) The direction cosines of $\underline{u} = \underline{i} + \underline{j} + \underline{k}$ are:

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(12) If $5\underline{i} - \underline{j} + \underline{k}$ and $\alpha\underline{i} + 3\underline{j} - 3\underline{k}$ are parallel then $\alpha = ?$ (A) -3 (B) -15 (C) 15 (D) 3

(13) If $g(x) = \frac{1}{x^2}$, $(x \neq 0)$ then $gog(x) =$ _____ (A) 1 (B) x^2 (C) x^4 (D) $1/x^4$

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(15) If $y = \sinh 2x$, then $\frac{dy}{dx} =$ _____

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(20) $\int e^{\ell nx} dx =$ _____ (A) $e^{\ell nx} + c$ (B) $\ell nx + c$ (C) $x^2 + c$ (D) $\frac{x^2}{2} + c$

Paper Code Number: 4197

2021 Roll No: _____

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MATHEMATICS PAPER-II

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OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

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(2) $1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ----$ is Maclaurin series of: (A) $\sin x$ (B) $\cos x$ (C) ℓnx (D) e^x

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

(4) $\int e^{\ell nx} dx =$ _____ (A) $e^{\ell nx} + c$ (B) $\ell nx + c$ (C) $x^2 + c$ (D) $\frac{x^2}{2} + c$

(5) $\int \sin x \cos x \, dx =$ _____

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

(6) $\int x e^x dx =$ _____

(A) $xe^x - e^x + c$ (B) $e^x - xe^x + c$ (C) $e^x + x + c$ (D) $e^x - x + c$

(7) Intercept form of equation of line is:

(A) $\frac{x}{a} + \frac{y}{b} = 0$ (B) $\frac{x}{a} + \frac{y}{b} = 1$ (C) $y = mx + c$ (D) $y - y_1 = m(x - x_1)$

(8) The distance of a point $(3, 7)$ from $x-$axis is: (A) -3 (B) 3 (C) -7 (D) 7

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

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(A) $\sqrt{g^2 + f^2 + c}$ (B) $\sqrt{g^2 - f^2 - c}$ (C) $\sqrt{f^2 - g^2 - c}$ (D) $\sqrt{g^2 + f^2 - c}$

(14) $2\underline{j} \cdot (2\underline{k} \times \underline{i})$ is equal to: (A) 0 (B) -4 (C) 4 (D) 1

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(A) $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (B) $-\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (C) $\frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$ (D) $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, -\frac{1}{\sqrt{3}}$

(16) If $5\underline{i} - \underline{j} + \underline{k}$ and $\alpha\underline{i} + 3\underline{j} - 3\underline{k}$ are parallel then $\alpha = ?$ (A) -3 (B) -15 (C) 15 (D) 3

(17) If $g(x) = \frac{1}{x^2}$, $(x \neq 0)$ then $gog(x) =$ _____ (A) 1 (B) x^2 (C) x^4 (D) $1/x^4$

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(19) If $y = \sinh 2x$, then $\frac{dy}{dx} =$ _____

(A) $2\cosh 2x$ (B) $-2\cosh 2x$ (C) $\cosh 2x$ (D) $-\cosh 2x$

(20) $\frac{d}{dx}(\sqrt{x+2}) =$ _____

(A) $\frac{1}{2}(x+2)^{3/2}$ (B) $\frac{1}{2\sqrt{x+2}}$ (C) $\frac{2}{3}(x+2)^{3/2}$ (D) $-\frac{1}{2\sqrt{x+2}}$

29-11-2021

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION,MULTAN. Special

OBJECTIVE KEY FOR INTERMEDIATE ANNUAL EXAMINATION,2021'

Name of Subject: Maths II Session: Special 2021

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

سرٹیفکیٹ بابت تصحیح سوالیہ پرچہ/مارکنگ Key

ہم نے مضمون ریاضی پرچہ سائنس گروپ انٹرمیڈیٹ پارٹ سیکنڈ سالانہ امتحان 2021ء کا سوالیہ پرچہ انشائیہ ومعروضی (Subjective & Objective) کو بنظرِ عمیق چیک کرلیا ہے یہ پرچہ ALP 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:**_____

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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۔

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30-11-2021 تاریخ