BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN (233) 28/06/22

OBJECTIVE KEY FOR INTERMEDIATE ANNUAL EXAMINATION, 2022

Name of Subject: Mathematic (2nd) Session: 2020 - 2022

Group : 1st Group: 2nd

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

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

سرٹیفکیٹ بابت تصحیح سوالیہ پرچہ/مارکنگ Key

ہم نے مضمون _____ پرچہ Mathematics گروپ 2nd سیکشن 1st+2nd انٹرمیڈیٹ سالانہ امتحان 2022 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 کردی گئی ہیں۔

Prepared & Checked By: **Dated:** _____

S.#	Name	Designation	Institution	Mobile No	Signature
1	M. Ramzan Sheikh	Assoc. Prof	Govt. Almdm. H.Sc College	0318-833	
2	Ch. N. Yousaf	Assoc Prof	G. College c/l Multan	8382 0332-6008633	
3	Javed Iqbal Ansari	Asso. Prof (R)	Govt. Emerson college, Mult.	0300-6364668	
4	M. Adnan Anwar	Asst. Prof	Govt. Emerson college. Mlt.	03047066375	
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	Noor Ullah	Assoc. Prof	G.C.C. Lines MLT	03337649108	
2	Dr. Abdul Nasir	A.P	Emerson University Multan	03216319672	
3					

تاریخ _____

2022 (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) A stone falls from a height of 60m on the ground, the height h after x second is approximately given by $h(x) = 40 - 10x^2$.

(a) What is the height of the stone for $x = 1$sec (b) When does the stone strike the ground?

(ii) For the real-valued function, f defined below, find $f^{-1}(x)$ of $f(x) = \frac{2x+1}{x-1}, x > 1$

(iii) Evaluate limit by using algebraic techniques; $\lim_{x \to 2} \frac{\sqrt{x} - \sqrt{2}}{x - 2}$

(iv) Express limit in terms of e: $\lim_{x \to \infty} \left(\frac{x}{1+x} \right)^x$

(v) Differentiate between $\log x$ and ℓnx by sketching the graph.

(vi) If $y = \frac{\sqrt{x^2+1}}{\sqrt{x^2-1}}$, find $\frac{dy}{dx}$

(vii) Prove that $y\frac{dy}{dx} + x = 0$ if $x = \frac{1-t^2}{1+t^2}$ and $y = \frac{2t}{1+t^2}$

(viii) Find the derivative w.r.t variable involved. $Cot^{-1}\left(\frac{2x}{1-x^2} \right)$

(ix) Find $f'(x)$ if $f(x) = \sqrt{\ell n(e^{2x} + e^{-2x})}$

(x) Produce y_2 from $x^3 - y^3 = a^3$

(xi) Determine the interval in which f is increasing $f(x) = \sin x$; $x \in (-\pi, \pi)$

(xii) Find the dimensions of a rectangle of largest area having perimeter 120 centimeters.

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

(i) Find the approximate increase in the volume of a cube if the length of its each edge changes from 5 to 5.02.

(ii) Evaluate $\int \frac{(1+e^x)^3}{e^x} dx$

(iii) Evaluate by using suitable substitution the integral $\int \frac{1}{\sqrt{a^2 - x^2}} dx$

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

(v) Evaluate the definite integral $\int_0^2 (e^{\frac{x}{2}} - e^{\frac{-x}{2}})\, dx$

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

(vii) Check whether $y = cx - 1$ is the solution of the differential equation $x\frac{dy}{dx} = 1 + y$

(viii) Solve the differential equation $\frac{dy}{dx} = \frac{3}{4}x^2 + x - 3$

(ix) Find the equation of the straight line if it is perpendicular to a line with slope -6 and its y – intercept is $\frac{4}{3}$

(x) Check whether the origin and the point P (5, –8) lies on the same side or on opposite side of line $3x + 7y + 15 = 0$

(xi) Find k so that the line joining $A(7, 3)$, $B(k, -6)$ and the line joining $C(-4, 5)$, $D(-6, 4)$ are parallel.

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

P.T.O.

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

(i) Shade the feasible region of $5x + 7y \leq 35$

(ii) State the theorem of linear programming.

(iii) Write the equation of the circle with centre at $(\sqrt{2}, -3\sqrt{3})$ and radius is $2\sqrt{2}$.

(iv) Find the centre and radius of circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$

(v) Write the equation of tangent to the circle $x^2 + y^2 = 25$ at $(4, 3)$.

(vi) Define parabola and write its General equation.

(vii) Find the focus and vertex of $x^2 = -16y$.

(viii) Find the equation of ellipse with data foci $(\pm 3, 0)$ and minor axis of length 10.

(ix) Write any two properties of cross product.

(x) If $\underline{u} = 2\hat{i} - \hat{j} + \hat{k}$ and $\underline{v} = 4\hat{i} + 2\hat{j} - \hat{k}$ find $\underline{u} \times \underline{v}$

(xi) Prove that $\underline{a} \times (\underline{b} + \underline{c}) + \underline{b} \times (\underline{c} + \underline{a}) + \underline{c} \times (\underline{a} + \underline{b}) = 0$

(xii) Find the value of $\begin{vmatrix} \hat{i} & \hat{i} & \hat{k} \end{vmatrix}$

(xiii) Find α so that the vectors $\vec{u} = \alpha\hat{i} + 2\alpha\hat{j} - \hat{k}$, $\vec{v} = \hat{i} + \alpha\hat{j} + 3\hat{k}$ are perpendicular.

SECTION-II

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

5.(a) If $f(x) = \dfrac{2x+1}{x-1}$, $x > 1$ then find $f^{-1}(x)$ and show that $f(f^{-1}(x)) = x$

(b) If $x = a\cos^3\theta$ and $y = b\sin^3\theta$ then show $a\dfrac{dy}{dx} + b\tan\theta = 0$

6.(a) Evaluate $\displaystyle\int \frac{x\,dx}{4 + 2x + x^2}$

(b) The points $A(4, -2)$, $B(-2, 4)$, $C(5, 5)$ are the vertices of a triangle. Find the in-centre of the triangle.

7. (a) Find the area between the $x-$axis and the curve $y = \sqrt{2ax - x^2}$ when $a > 0$

(b) Maximize $f(x, y) = 2x + 5y$ subject to constraints $2y - x \leq 8$, $x - y \leq 4$, $x \geq 0$, $y \geq 0$

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

(b) Find the length of the tangent from the point $P(-5, 10)$ to the circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$

9.(a) Find an equation of hyperbola with foci $(0, \pm 9)$, directrices $y = \pm 4$

(b) Use vectors, prove that $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$

Code Number: 4191 | 2022 (A) | Roll No: _____ (251)

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, 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) The term function was recognized by a German Mathematician _____.
(A) Leibniz (B) Newton (C) Cauchy (D) Langrage

(2) Which one is Identity function?
(A) $f(x) = \sin x$ (B) $f(x) = \sqrt{x}$ (C) $f(x) = x^2$ (D) $f(x) = x$

(3) $\frac{d}{dx}(2^x) =$ _____ (A) $x2^{x-1}$ (B) $2^x \ln 2$ (C) 0 (D) $2\ln 2$

(4) Newton used _____ notation for derivative.
(A) $f'(x)$ (B) $\frac{dy}{dx}$ (C) $\dot{f}(x)$ (D) $Df(x)$

(5) $\frac{d}{dx}(\tan 7x) =$ _____
(A) $7\sec^2 7x$ (B) $7\sec^2 x$ (C) $7\sec 7x$ (D) $\cot 7x$

(6) Which one is increasing function?
(A) $-5x$ (B) $-2x + 4$ (C) $-4 - 2x$ (D) $5x - 7$

(7) Find dy, for $y = x^2 + 2x$ when x changes from 2 to 1.8.
(A) -1.02 (B) -0.012 (C) -0.2 (D) -1.2

(8) $\int \tan x dx =$ _____
(A) $\ln|\cos x| + c$ (B) $\ln|\sec x| + c$ (C) $\ln|\sin x| + c$ (D) $\ln|\cot x| + c$

(9) $\int_a^c f(x)dx + \int_c^b f(x)dx =$ _____ where $a < c < b$
(A) $\int_a^b f(x)dx$ (B) $\int_b^a f(x)dx$ (C) $\int_{-a}^b f(x)dx$ (D) $\int_c^a f(x)dx$

(10) The order of differential equation $y\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2x = 0$ is: (A) 1 (B) 2 (C) 3 (D) 4

(11) Mid point of $A(-8, 3)$ and $B(2, -1)$ is _____.
(A) $(-3, 1)$ (B) $(3, -1)$ (C) $(-3, -1)$ (D) $(3, 1)$

(12) Slope of Horizontal line is _____. (A) ∞ (B) $-\infty$ (C) 0 (D) 1

(13) Slope of $3x + 2y - 8 = 0$ is _____.
(A) $\frac{2}{3}$ (B) $\frac{-2}{3}$ (C) 1 (D) $\frac{-3}{2}$

(14) The angle between the lines with slope $\frac{-7}{3}$ to the line slope $\frac{5}{2}$ is _____.
(A) 90^o (B) 145^o (C) 135^o (D) 60^o

(15) If $P(x, y) = 40x + 50y$ then $P(16, 10) =$ _____
(A) 1000 (B) 1140 (C) 0 (D) 1

(16) Centre of $5x^2 + 5y^2 + 14x + 12y - 10 = 0$
(A) $\left(\frac{7}{5}, \frac{6}{5}\right)$ (B) $(-7, -6)$ (C) $\left(\frac{-7}{5}, \frac{-6}{5}\right)$ (D) $(7, 6)$

(17) Latusrectum of $y^2 = -4ax$ is _____.
(A) $x = -a$ (B) $y = -a$ (C) $y = a$ (D) $x = a$

(18) Eccentricity of $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ is _____.
(A) $e = \frac{c}{a}$ (B) $e = \frac{-c}{a}$ (C) $e = \frac{c}{b}$ (D) $e = \frac{a}{b}$

(19) $3\underline{j} . \underline{k} \times \underline{i} =$ _____ (A) 1 (B) -1 (C) -3 (D) 3

(20) Which one is not a vector quantity?
(A) Magnetic field (B) Weight (C) Force (D) Work

Paper Number: 4193 2022 (A) Roll No: 252

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

(1) Centre of $5x^2 + 5y^2 + 14x + 12y - 10 = 0$

(A) $\left(\frac{7}{5}, \frac{6}{5}\right)$ (B) $(-7, -6)$ (C) $\left(\frac{-7}{5}, \frac{-6}{5}\right)$ (D) $(7, 6)$

(2) Latusrectum of $y^2 = -4ax$ is _____.

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

(3) Eccentricity of $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ is _____.

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

(4) $3\underline{j} . \underline{k} \times \underline{i} =$ _____ (A) 1 (B) -1 (C) -3 (D) 3

(5) Which one is not a vector quantity?

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(6) The term function was recognized by a German Mathematician _____.

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(A) $f'(x)$ (B) $\frac{dy}{dx}$ (C) $\dot{f}(x)$ (D) $Df(x)$

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(14) $\int_a^c f(x)dx + \int_c^b f(x)dx =$ _____ where $a < c < b$

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(15) The order of differential equation $y\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2x = 0$ is: (A) 1 (B) 2 (C) 3 (D) 4

(16) Mid point of $A(-8, 3)$ and $B(2, -1)$ is _____.

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(19) The angle between the lines with slope $\frac{-7}{3}$ to the line slope $\frac{5}{2}$ is _____.

(A) $90°$ (B) $145°$ (C) $135°$ (D) $60°$

(20) If $P(x, y) = 40x + 50y$ then $P(16, 10) =$ _____

(A) 1000 (B) 1140 (C) 0 (D) 1

Number: 4195 2022 (A) Roll No: 253

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II

GROUP-I

TIME ALLOWED: 30 Minutes

OBJECTIVE

MAXIMUM MARKS: 20

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(20) The order of differential equation $y\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2x = 0$ is: (A) 1 (B) 2 (C) 3 (D) 4

Paper Code Number: 4197

2022 (A)

Roll No: _____ (254)

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II

GROUP-I

TIME ALLOWED: 30 Minutes

MAXIMUM MARKS: 20

OBJECTIVE

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

(7) Slope of Horizontal line is _____. (A) ∞ (B) $-\infty$ (C) 0 (D) 1

(8) Slope of $3x + 2y - 8 = 0$ is _____.

(A) $\frac{2}{3}$ (B) $\frac{-2}{3}$ (C) 1 (D) $\frac{-3}{2}$

(9) The angle between the lines with slope $\frac{-7}{3}$ to the line slope $\frac{5}{2}$ is _____.

(A) 90^o (B) 145^o (C) 135^o (D) 60^o

(10) If $P(x, y) = 40x + 50y$ then $P(16, 10) =$ _____

(A) 1000 (B) 1140 (C) 0 (D) 1

(11) Centre of $5x^2 + 5y^2 + 14x + 12y - 10 = 0$

(A) $\left(\frac{7}{5}, \frac{6}{5}\right)$ (B) $(-7, -6)$ (C) $\left(\frac{-7}{5}, \frac{-6}{5}\right)$ (D) $(7, 6)$

(12) Latusrectum of $y^2 = -4ax$ is _____.

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

(13) Eccentricity of $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ is _____.

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

(14) $3\underline{j}.\underline{k} \times \underline{i} =$ _____ (A) 1 (B) -1 (C) -3 (D) 3

(15) Which one is not a vector quantity?

(A) Magnetic field (B) Weight (C) Force (D) Work

(16) The term function was recognized by a German Mathematician _____.

(A) Leibniz (B) Newton (C) Cauchy (D) Langrage

(17) Which one is Identity function?

(A) $f(x) = \sin x$ (B) $f(x) = \sqrt{x}$ (C) $f(x) = x^2$ (D) $f(x) = x$

(18) $\frac{d}{dx}(2^x) =$ _____ (A) $x2^{x-1}$ (B) $2^x \ln 2$ (C) 0 (D) $2\ln 2$

(19) Newton used _____ notation for derivative.

(A) $f'(x)$ (B) $\frac{dy}{dx}$ (C) $\dot{f}(x)$ (D) $Df(x)$

(20) $\frac{d}{dx}(\tan 7x) =$ _____

(A) $7\sec^2 7x$ (B) $7\sec^2 x$ (C) $7\sec 7x$ (D) $\cot 7x$

2022 (A) Roll No: _____ 255

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) Define a polynomial function of degree n.

(ii) Determine whether the given function is odd or even $f(x) = \dfrac{3x}{x^2+1}$

(iii) Evaluate $\lim\limits_{x\to\infty}\left(1+\dfrac{3}{n}\right)^{2n}$

(iv) Find the limit of $\lim\limits_{x\to 2}\dfrac{x^3-8}{x^2-x-6}$

(v) Prove the identity $\cosh^2 x + \sinh^2 x = \cosh 2x$

(vi) Find the derivative of $x^{\frac{2}{3}}$ and also calculate the value of derivative at $x = 8$

(vii) Find $\dfrac{dy}{dx}$ if $x = 1 - t^2$ and $y = 3t^2 - 2t^3$

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

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

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

(xi) Find $\dfrac{dy}{dx}$ if $y = e^{x^2+1}$

(xii) What do you mean by power series?

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

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

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

(iii) Evaluate $\int\dfrac{x^2}{4+x^2}dx$

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

(v) Evaluate $\int_1^2 \dfrac{x^2+1}{x+1}dx$

(vi) Evaluate $\int_0^3 \dfrac{dx}{x^2+9}$

(vii) Find the area between the x-axis and the curve $y = x^2 + 1$ from $x = 1$ to $x = 2$

(viii) Solve the differential equation $\dfrac{dy}{dx} = \dfrac{1-x}{y}$

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

(x) Find the points trisecting the join of $A(-1, 4)$ and $B(6, 2)$.

(xi) Find k so that the line joining $A(7, 3)$; $B(k, -6)$ and the line joining $C(-4, 5)$; $D(-6, 4)$ are parallel.

(xii) Find measure of the angle between the lines represented by $x^2 - xy - 6y^2 = 0$

P.T.O.

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

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

(ii) Describe the corner point of the solution region.

(iii) Calculate the centre and radius of circle. $5x^2 + 5y^2 + 24x + 36y + 10 = 0$

(iv) Write down equation of the normal line to the circle $x^2 + y^2 = 25$ at $(5\cos\theta, 5\sin\theta)$

(v) Determine the focus and directrix of $x^2 = -16y$

(vi) Find the eccentricity of the ellipse $9x^2 + y^2 = 18$

(vii) Form an equation of the hyperbola whose foci are $(\pm 4, 0)$ and vertices $(\pm 2, 0)$.

(viii) Find the points of intersection of $x^2 + y^2 = 8$ and $x^2 - y^2 = 1$

(ix) Determine the vector from the point A to origin where $\overrightarrow{AB} = 4\underline{i} - 2\underline{j}$ and $B(-2, 5)$

(x) What are the direction cosines of $\underline{v} = 6\underline{i} - 2\underline{j} + \underline{k}$?

(xi) If $\underline{a} = \underline{i} - \underline{k}$, $\underline{b} = \underline{j} + \underline{k}$ calculate the projection of $\underline{a}$ along $\underline{b}$.

(xii) Prove that $\underline{a} \times (\underline{b} + \underline{c}) + \underline{b} \times (\underline{c} + \underline{a}) + \underline{c} \times (\underline{a} + \underline{b}) = 0$

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

SECTION-II

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

5.(a) Evaluate $\lim\limits_{\theta \to 0} \dfrac{\tan\theta - \sin\theta}{\sin^3\theta}$

(b) If $y = e^x \sin x$, show that $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + 2y = 0$

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

(b) Find equations of the altitudes of the triangle whose vertices are $A(-3, 2)$, $B(5, 4)$, $C(3, -8)$

7. (a) Evaluate $\int_0^{\frac{\pi}{4}} \dfrac{dx}{1 + \sin x}$

(b) Indicate the solution region of the following system of linear inequality by shading
$5x + 7y \leq 35$, $x - 2y \leq 2$, $x \geq 0$

8. (a) Find a joint equation of the straight line through the origin perpendicular to the lines represented by $x^2 + xy - 6y^2 = 0$

(b) Find the length of the chord cut off from the line $2x + 3y = 13$ by the circle $x^2 + y^2 = 26$

9.(a) Find the centre, foci eccentricity , vertices and directrices of the ellipse $9x^2 + y^2 = 18$

(b) Find the volume of the tetrahedron with vertices $(0, 1, 2)$, $(3, 2, 1)$, $(1, 2, 1)$ and $(5, 5, 6)$

Code Number: 4192

2022 (A) INTERMEDIATE PART-II (12th CLASS)

Roll No: 256

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, 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 $f(x) = -2x + 8$, then $f^{-1}(x) = ?$ (A) $\frac{2-x}{8}$ (B) $2x - 8$ (C) $\frac{8-x}{2}$ (D) $\frac{8+x}{2}$

(2) The domain of $f(x) = \sqrt{x}$ is: (A) IR (B) $[0, +\infty]$ (C) $[1, +\infty]$ (D) $[2, +\infty]$

(3) If $x^2 + y^2 = 4$, then $\frac{dy}{dx} = ?$ (A) $-\frac{x}{y}$ (B) $\frac{x}{y}$ (C) $\frac{y}{x}$ (D) $-\frac{y}{x}$

(4) If $f(x) = \sin x$, then $f'\left(\frac{\pi}{2}\right) = ?$ (A) 1 (B) -1 (C) $\frac{1}{2}$ (D) 0

(5) $\frac{d}{dx}(\ell n(\sec x)) = ?$ (A) $\sec x$ (B) $\sec x \tan x$ (C) $\tan x$ (D) $\cot x$

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

(7) $\int \frac{1}{x}.\ell nx \, dx = ?$ (A) $\ell nx + c$ (B) $\frac{(\ell nx)^2}{2} + c$ (C) $\frac{1}{x} + c$ (D) $\frac{1}{x^2} + c$

(8) $\int e^{\sin x} \cos x \, dx = ?$ (A) $e^{\sin x} \cos x + c$ (B) $e^{\cos x} + c$ (C) $e^x + c$ (D) $e^{\sin x} + c$

(9) $\int_{-1}^{1} x dx = ?$ (A) 2 (B) 0 (C) 1 (D) $\frac{1}{2}$

(10) $\int (\sec^2 x - \tan^2 x) \, dx = ?$ (A) $x + c$ (B) $\frac{x^2}{2} + c$ (C) $\tan x + c$ (D) $\sec^2 x + c$

(11) The line $ax + by + c = 0$ is parallel to $y-$axis if: (A) $c = 0$ (B) $a = 0$ (C) $a = b$ (D) $b = 0$

(12) Slope of a line perpendicular to $x = 3$ is: (A) 1 (B) -1 (C) 0 (D) Undefined

(13) The distance of $(3, 7)$ from $x = 0$ is: (A) 3 (B) -3 (C) 7 (D) -7

(14) $x-$intercept of $2x + 3y - 1 = 0$ is: (A) $\frac{1}{2}$ (B) 2 (C) 3 (D) $\frac{1}{3}$

(15) $x = 5$ is a solution of: (A) $x < 0$ (B) $x + 4 < 0$ (C) $2x - 3 < 0$ (D) $2x + 3 > 0$

(16) $2x^2 + 3y^2 = 16$ is an equation of: (A) Circle (B) Hyperbola (C) Parabola (D) Ellipse

(17) Length of a latus rectum of $y^2 = 4x$ is: (A) 4 (B) 1 (C) 2 (D) $\frac{1}{4}$

(18) Conic is circle of eccentricity e is: (A) $e > 1$ (B) $e = 0$ (C) $e < 1$ (D) $e = 1$

(19) Projection of a vector $\vec{a}$ along $\vec{b}$ is: (A) $\vec{a}.\vec{b}$ (B) $\frac{\vec{a}.\vec{b}}{a}$ (C) $\frac{\vec{a}.\vec{b}}{b}$ (D) $\vec{b} \times \vec{a}$

(20) The direction cosines of a vector $\hat{j}$ are: (A) 1, 0, 0 (B) 0, 1, 0 (C) 0, 0, 1 (D) 1, 1, 1

Paper: 4194 | 2022 (A) | Roll No: 257

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, 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) $2x^2 + 3y^2 = 16$ is an equation of: (A) Circle (B) Hyperbola (C) Parabola (D) Ellipse

(2) Length of a latus rectum of $y^2 = 4x$ is: (A) 4 (B) 1 (C) 2 (D) $\frac{1}{4}$

(3) Conic is circle of eccentricity e is: (A) $e > 1$ (B) $e = 0$ (C) $e < 1$ (D) $e = 1$

(4) Projection of a vector $\vec{a}$ along $\vec{b}$ is: (A) $\vec{a}.\vec{b}$ (B) $\frac{\vec{a}.\vec{b}}{a}$ (C) $\frac{\vec{a}.\vec{b}}{b}$ (D) $\vec{b} \times \vec{a}$

(5) The direction cosines of a vector $\hat{j}$ are: (A) 1, 0, 0 (B) 0, 1, 0 (C) 0, 0, 1 (D) 1, 1, 1

(6) If $f(x) = -2x + 8$, then $f^{-1}(x) = ?$ (A) $\frac{2-x}{8}$ (B) $2x - 8$ (C) $\frac{8-x}{2}$ (D) $\frac{8+x}{2}$

(7) The domain of $f(x) = \sqrt{x}$ is: (A) IR (B) $[0, +\infty]$ (C) $[1, +\infty]$ (D) $[2, +\infty]$

(8) If $x^2 + y^2 = 4$, then $\frac{dy}{dx} = ?$ (A) $-\frac{x}{y}$ (B) $\frac{x}{y}$ (C) $\frac{y}{x}$ (D) $-\frac{y}{x}$

(9) If $f(x) = \sin x$, then $f'\left(\frac{\pi}{2}\right) = ?$ (A) 1 (B) -1 (C) $\frac{1}{2}$ (D) 0

(10) $\frac{d}{dx}(\ell n(\sec x)) = ?$ (A) $\sec x$ (B) $\sec x \tan x$ (C) $\tan x$ (D) $\cot x$

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

(12) $\int \frac{1}{x}.\ell nx \, dx = ?$ (A) $\ell nx + c$ (B) $\frac{(\ell nx)^2}{2} + c$ (C) $\frac{1}{x} + c$ (D) $\frac{1}{x^2} + c$

(13) $\int e^{\sin x} \cos x \, dx = ?$ (A) $e^{\sin x} \cos x + c$ (B) $e^{\cos x} + c$ (C) $e^x + c$ (D) $e^{\sin x} + c$

(14) $\int_{-1}^{1} x dx = ?$ (A) 2 (B) 0 (C) 1 (D) $\frac{1}{2}$

(15) $\int (\sec^2 x - \tan^2 x) \, dx = ?$ (A) $x + c$ (B) $\frac{x^2}{2} + c$ (C) $\tan x + c$ (D) $\sec^2 x + c$

(16) The line $ax + by + c = 0$ is parallel to $y-$axis if: (A) $c = 0$ (B) $a = 0$ (C) $a = b$ (D) $b = 0$

(17) Slope of a line perpendicular to $x = 3$ is: (A) 1 (B) -1 (C) 0 (D) Undefined

(18) The distance of $(3, 7)$ from $x = 0$ is: (A) 3 (B) -3 (C) 7 (D) -7

(19) $x-$intercept of $2x + 3y - 1 = 0$ is: (A) $\frac{1}{2}$ (B) 2 (C) 3 (D) $\frac{1}{3}$

(20) $x = 5$ is a solution of: (A) $x < 0$ (B) $x + 4 < 0$ (C) $2x - 3 < 0$ (D) $2x + 3 > 0$

Code Number: 4196

2022 (A)

Roll No: _____ (288)

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, 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) $\int e^{\sin x}\cos x\,dx = ?$ (A) $e^{\sin x}\cos x + c$ (B) $e^{\cos x} + c$ (C) $e^{x} + c$ (D) $e^{\sin x} + c$

(2) $\int_{-1}^{1} x\,dx = ?$ (A) 2 (B) 0 (C) 1 (D) $\frac{1}{2}$

(3) $\int(\sec^2 x - \tan^2 x)\,dx = ?$ (A) $x + c$ (B) $\frac{x^2}{2} + c$ (C) $\tan x + c$ (D) $\sec^2 x + c$

(4) The line $ax + by + c = 0$ is parallel to $y-$axis if: (A) $c = 0$ (B) $a = 0$ (C) $a = b$ (D) $b = 0$

(5) Slope of a line perpendicular to $x = 3$ is: (A) 1 (B) -1 (C) 0 (D) Undefined

(6) The distance of $(3, 7)$ from $x = 0$ is: (A) 3 (B) -3 (C) 7 (D) -7

(7) $x-$intercept of $2x + 3y - 1 = 0$ is: (A) $\frac{1}{2}$ (B) 2 (C) 3 (D) $\frac{1}{3}$

(8) $x = 5$ is a solution of: (A) $x < 0$ (B) $x + 4 < 0$ (C) $2x - 3 < 0$ (D) $2x + 3 > 0$

(9) $2x^2 + 3y^2 = 16$ is an equation of: (A) Circle (B) Hyperbola (C) Parabola (D) Ellipse

(10) Length of a latus rectum of $y^2 = 4x$ is: (A) 4 (B) 1 (C) 2 (D) $\frac{1}{4}$

(11) Conic is circle of eccentricity e is: (A) $e > 1$ (B) $e = 0$ (C) $e < 1$ (D) $e = 1$

(12) Projection of a vector $\vec{a}$ along $\vec{b}$ is: (A) $\vec{a}.\vec{b}$ (B) $\frac{\vec{a}.\vec{b}}{a}$ (C) $\frac{\vec{a}.\vec{b}}{b}$ (D) $\vec{b} \times \vec{a}$

(13) The direction cosines of a vector $\hat{j}$ are: (A) 1, 0, 0 (B) 0, 1, 0 (C) 0, 0, 1 (D) 1, 1, 1

(14) If $f(x) = -2x + 8$, then $f^{-1}(x) = ?$ (A) $\frac{2 - x}{8}$ (B) $2x - 8$ (C) $\frac{8 - x}{2}$ (D) $\frac{8 + x}{2}$

(15) The domain of $f(x) = \sqrt{x}$ is: (A) IR (B) $[0, +\infty]$ F.C (C) $[1, +\infty]$ (D) $[2, +\infty]$

(16) If $x^2 + y^2 = 4$, then $\frac{dy}{dx} = ?$ (A) $-\frac{x}{y}$ (B) $\frac{x}{y}$ (C) $\frac{y}{x}$ (D) $-\frac{y}{x}$

(17) If $f(x) = \sin x$, then $f'\left(\frac{\pi}{2}\right) = ?$ (A) 1 (B) -1 (C) $\frac{1}{2}$ (D) 0

(18) $\frac{d}{dx}(\ell n(\sec x)) = ?$ (A) $\sec x$ (B) $\sec x \tan x$ (C) $\tan x$ (D) $\cot x$

(19) $\frac{d}{dx}(\cot h^{-1} x) = ?$ (A) $\frac{1}{1 - x^2}$ (B) $\frac{1}{1 + x^2}$ (C) $\frac{-1}{1 + x^2}$ (D) $\frac{1}{x^2 - 1}$

(20) $\int \frac{1}{x}.\ell nx\,dx = ?$ (A) $\ell nx + c$ (B) $\frac{(\ell nx)^2}{2} + c$ (C) $\frac{1}{x} + c$ (D) $\frac{1}{x^2} + c$

Code Number: 4198

2022 (A) Roll No: 259

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, 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 $f(x) = \sin x$, then $f'\left(\frac{\pi}{2}\right) = ?$ (A) 1 (B) -1 (C) $\frac{1}{2}$ (D) 0

(2) $\frac{d}{dx}(\ell n(\sec x)) = ?$ (A) $\sec x$ (B) $\sec x \tan x$ (C) $\tan x$ (D) $\cot x$

(3) $\frac{d}{dx}(\cot h^{-1} x) = ?$ (A) $\frac{1}{1-x^2}$ (B) $\frac{1}{1+x^2}$ (C) $\frac{-1}{1+x^2}$ (D) $\frac{1}{x^2-1}$

(4) $\int \frac{1}{x}.\ell nx \, dx = ?$ (A) $\ell nx + c$ (B) $\frac{(\ell nx)^2}{2} + c$ (C) $\frac{1}{x} + c$ (D) $\frac{1}{x^2} + c$

(5) $\int e^{\sin x} \cos x \, dx = ?$ (A) $e^{\sin x} \cos x + c$ (B) $e^{\cos x} + c$ (C) $e^x + c$ (D) $e^{\sin x} + c$

(6) $\int_{-1}^{1} x dx = ?$ (A) 2 (B) 0 (C) 1 (D) $\frac{1}{2}$

(7) $\int (\sec^2 x - \tan^2 x) \, dx = ?$ (A) $x + c$ (B) $\frac{x^2}{2} + c$ (C) $\tan x + c$ (D) $\sec^2 x + c$

(8) The line $ax + by + c = 0$ is parallel to y-axis if: (A) $c = 0$ (B) $a = 0$ (C) $a = b$ (D) $b = 0$

(9) Slope of a line perpendicular to $x = 3$ is: (A) 1 (B) -1 (C) 0 (D) Undefined

(10) The distance of $(3, 7)$ from $x = 0$ is: (A) 3 (B) -3 (C) 7 (D) -7

(11) x-intercept of $2x + 3y - 1 = 0$ is: (A) $\frac{1}{2}$ (B) 2 (C) 3 (D) $\frac{1}{3}$

(12) $x = 5$ is a solution of: (A) $x < 0$ (B) $x + 4 < 0$ (C) $2x - 3 < 0$ (D) $2x + 3 > 0$

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(16) Projection of a vector $\vec{a}$ along $\vec{b}$ is: (A) $\vec{a}.\vec{b}$ (B) $\frac{\vec{a}.\vec{b}}{a}$ (C) $\frac{\vec{a}.\vec{b}}{b}$ (D) $\vec{b} \times \vec{a}$

(17) The direction cosines of a vector $\hat{j}$ are: (A) 1, 0, 0 (B) 0, 1, 0 (C) 0, 0, 1 (D) 1, 1, 1

(18) If $f(x) = -2x + 8$, then $f^{-1}(x) = ?$ (A) $\frac{2-x}{8}$ (B) $2x - 8$ (C) $\frac{8-x}{2}$ (D) $\frac{8+x}{2}$

(19) The domain of $f(x) = \sqrt{x}$ is: (A) IR (B) $[0, +\infty]$ E.C (C) $[1, +\infty]$ (D) $[2, +\infty]$

(20) If $x^2 + y^2 = 4$, then $\frac{dy}{dx} = ?$ (A) $-\frac{x}{y}$ (B) $\frac{x}{y}$ (C) $\frac{y}{x}$ (D) $-\frac{y}{x}$