

INTERMEDIATE PART-II (12th CLASS)

MATHEMATICS PAPER-II

TIME ALLOWED: 2.30 Hours

MAXIMUM MARKS: 80

SUBJECTIVE

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 $f^{-1}(x)$ if $f(x) = -2x + 8$

(ii) Evaluate $\lim_{x \rightarrow 2} \frac{\sqrt{x} - \sqrt{2}}{x - 2}$

(iii) Evaluate $\lim_{x \rightarrow 0} \frac{\sin x^0}{x}$

(iv) Diff. w.r.t. x by definition $2x^2 + 1$

(v) If $y = x^4 + 2x^2 + 2$ then find $\frac{dy}{dx}$

(vi) Find $\frac{dy}{dx}$ if $y = (x^3 + 1)^9$

(vii) Find $\frac{dy}{dx}$ if $x^2 - 4xy - 5y = 0$

(viii) Diff. $\sin^3 x$ w.r.t. $\cos^2 x$

(ix) Find $f'(x)$ when $f(x) = \frac{e^{ax} - e^{-ax}}{e^{ax} + e^{-ax}}$

(x) Find $\frac{dy}{dx}$ if $x = at^2$, $y = bt^4$

(xi) Apply Maclaurin's series to prove that $e^{2x} = 1 + 2x + \frac{4x^2}{2} + \dots$

(xii) Determine the interval in which f is increasing, $f(x) = 4 - x^2$, $x \in (-2, 2)$

3. Attempt any eight parts.

8 × 2 = 16

(i) $y = x^2 - 4$, x changes from 3 to 3.02. Find δy .

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

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

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

(v) Evaluate $\int e^x \left(\frac{1}{x} + \ln x \right) dx$

(vi) $\int \frac{dx}{x^2 + 4x + 13}$ evaluate it.

(vii) Evaluate $\int_0^{\pi/4} \frac{1}{1 - \sin x} dx$

(viii) Evaluate $\int_1^2 (x^2 + 1) dx$

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

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

(xi) Graph $2x + y \geq 2$

(xii) Find corner points of $2x - 3y \leq 6$, $2x + 3y \leq 12$
 $x \geq 0$, $y \geq 0$

4. Attempt any nine parts.

 $9 \times 2 = 18$

- (i) Find the inclination of line joining the points $A(3, -2)$ and $B(2, 7)$
- (ii) By means of slope, show that the points $(-1, -3)$, $(1, 5)$ and $(2, 9)$ are on the same line.
- (iii) Convert the equation of line $2x - 4y + 11 = 0$ into slope-intercept form.
- (iv) Check the point $(-2, 3)$ lies above or below the line $3x - 5y + 8 = 0$
- (v) Find measure of the angle between the lines represented by $x^2 - xy - 6y^2 = 0$
- (vi) Find radius of the circle with equation $x^2 + y^2 + 12x - 10y = 0$
- (vii) Check position of point $(5, 6)$ with respect to the circle $x^2 + y^2 + 6x - 4y + \frac{1}{2} = 0$
- (viii) Find focus and vertex of the parabola $x^2 = -16y$
- (ix) Find equation of ellipse with foci $(\pm 3, 0)$ and minor axis of length 10.
- (x) Find a unit vector along the direction of vector $\underline{v} = -\frac{\sqrt{3}}{2}\underline{i} - \frac{1}{2}\underline{j}$
- (xi) Find a real number α so that vectors \underline{u} and \underline{v} are perpendicular,
 $\underline{u} = 2\alpha\underline{i} + \underline{j} - \underline{k}$, $\underline{v} = \underline{i} + \alpha\underline{j} + 4\underline{k}$
- (xii) Compute $\underline{a} \times \underline{b}$ if $\underline{a} = 2\underline{i} - 6\underline{j} - 3\underline{k}$, $\underline{b} = 4\underline{i} + 3\underline{j} - \underline{k}$
- (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) Find $\frac{f(a+h) - f(a)}{h}$ and simplify where $f(x) = \sin x$ (b) If $y = \sqrt{x} - \frac{1}{\sqrt{x}}$ show that $2x \frac{dy}{dx} + y = 2\sqrt{x}$ 6.(a) Solve $\frac{dy}{dx} = \frac{3}{4}x^2 + x - 3$ if $y = 0$ when $x = 2$ (b) Prove that the linear equation $ax + by + c = 0$ in two variables x and y represents a straight line.7. (a) Evaluate $\int_0^{\pi/4} \frac{\sec \theta}{\sin \theta + \cos \theta} d\theta$ (b) Minimize $z = 3x + y$ subject to the constraints $3x + 5y \geq 15$, $x + 6y \geq 9$
 $x \geq 0$, $y \geq 0$ 8. (a) Find an equation of the circle passing through $A(3, -1)$, $B(0, 1)$ and having centre at $4x - 3y - 3 = 0$ (b) If $\underline{u} = 2\underline{i} + 3\underline{j} + 4\underline{k}$, $\underline{v} = -\underline{i} + 3\underline{j} - \underline{k}$ and $\underline{w} = \underline{i} + 6\underline{j} + z\underline{k}$ represent the sides of a triangle. Find value of z .9.(a) Find an equation of the parabola with focus $(-3, 1)$ and directrix $x - 2y - 3 = 0$ (b) Prove that $\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$ by vector method.

MATHEMATICS PAPER-II

TIME ALLOWED: 30 Minutes

MAXIMUM MARKS: 20

OBJECTIVE

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 $x = a^y$ then $y =$ (A) $\log_a x$ (B) $\log_x a$ (C) $\log_e x$ (D) x^a
- (2) If $f : X \rightarrow X$ is defined as $f(x) = X$ then $f(x)$ is called:- (A) Constant function
(B) Exponential function (C) Identity function (D) Logarithmic function
- (3) Derivative of \sqrt{x} at $x = a$ is:- (A) $\frac{1}{2a}$ (B) $\frac{2}{\sqrt{a}}$ (C) $\frac{1}{2\sqrt{a}}$ (D) $2\sqrt{a}$
- (4) $\frac{d}{dx}(a^x) =$ (A) $x a^{x-1}$ (B) a^x (C) $\frac{a^x}{\ln a}$ (D) $a^x \ln a$
- (5) $\frac{d}{dx} \log(5x) =$ (A) $\frac{1}{x}$ (B) $\frac{1}{5x}$ (C) $\frac{1}{x} \times 5$ (D) $\frac{1}{x \ln 5}$
- (6) $\frac{d}{dx}(x^2 + f(x)) =$ (A) $2x + f'(x)$ (B) $2x + f(x)$ (C) $f'(x)$ (D) $2x + 0$
- (7) $\frac{d}{dx}(\cos^{-1} x) =$
(A) $\frac{1}{\sqrt{1-x^2}}$ (B) $-\frac{1}{\sqrt{1-x^2}}$ (C) $\frac{1}{\sqrt{x^2-1}}$ (D) $-\frac{1}{\sqrt{x^2-1}}$
- (8) $\int \frac{2x}{x^2+1} dx =$ (A) $\tan^{-1} x$ (B) $\ln|x^2+1|$ (C) $2 \tan^{-1} x$ (D) $2x \tan^{-1} x$
- (9) $\int \frac{1}{x^2} dx =$ (A) $\ln x$ (B) $\ln x^2$ (C) $-\frac{1}{x}$ (D) $-\frac{2}{x^3}$
- (10) $\int f^n(x) f'(x) dx =$ (A) $f^n(x) f''(x)$ (B) $f^n(x)$ (C) $\frac{f^2(x)}{2}$ (D) $\frac{f^{n+1}(x)}{n+1}$
- (11) $\int \ln x \cdot \frac{1}{x} dx =$
(A) $\frac{(\ln x)^2}{2}$ (B) $\ln(\ln x)$ (C) $\ln x \ln x$ (D) $\frac{(\ln x)^2}{2} \ln x$
- (12) $\int_a^b \frac{1}{x} dx =$ (A) $\ln\left(\frac{a}{b}\right)$ (B) $\ln\left(\frac{b}{a}\right)$ (C) $\frac{1}{b} - \frac{1}{a}$ (D) $b - a$
- (13) The distance of point $(-1, 2)$ from x -axis:- (A) -2 (B) -1 (C) 1 (D) 2
- (14) Equation of line bisecting 2nd and 4th quadrant is:-
(A) $y = x$ (B) $y = 2x$ (C) $y = -x$ (D) $2x = 4y$
- (15) Point of intersection of lines $x = 3, y = 2$ is:-
(A) $(3, 2)$ (B) $(2, 3)$ (C) $(0, 0)$ (D) Does not exist
- (16) Number of points which satisfy $x + y \leq 2$ is:- (A) 1 (B) 2 (C) Finite (D) Infinite
- (17) If e is eccentricity of hyperbola then:- (A) $e = 0$ (B) $e = 1$ (C) $0 < e < 1$ (D) $e > 1$
- (18) Set of all points equidistant from a fixed line and a fixed point is called:-
(A) Circle (B) Parabola (C) Ellipse (D) Hyperbola
- (19) For any vectors \underline{u} and \underline{v} , $\underline{u} + \underline{v} =$ (A) $\underline{u} - \underline{v}$ (B) $\underline{v} + \underline{u}$ (C) $\underline{v} - \underline{u}$ (D) $\underline{u} \cdot \underline{v}$
- (20) If $\underline{a}, \underline{b}$ are vectors then $\underline{a} \times \underline{b} =$
(A) $ab \sin \theta$ (B) $ab \cos \theta \hat{n}$ (C) $\underline{b} \times \underline{a}$ (D) $-\underline{b} \times \underline{a}$

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BOARD OF INTERMEDIATE AND SECONDARY EDUCATION,
MULTAN
OBJECTIVE KEY FOR INTER (PART I / II) Supply Examination, 2016.
 Name of Subject MATH R-II Session _____

Q. Nos.	Paper Code	Paper Code	Paper Code	Paper Code
	8191	8193	8195	8197
1.	A	D	A	A
2.	C	D	B	B
3.	F	B	D	B
4.	D	B	C	C
5.	A	D	A	D
6.	A	A	D	A
7.	B	C	D	B
8.	B	C	B	D
9.	C	D	B	C
10.	D	A	D	A
11.	A	A	A	D
12.	B	B	C	D
13.	D	B	C	B
14.	C	C	D	B
15.	A	D	A	D
16.	D	A	A	A
17.	D	B	B	C
18.	B	D	B	C
19.	B	C	C	D
20.	D	A	D	A

سرٹیفیکیٹ بابت تصحیح سوالیہ پرچہ/مارکنگ Key

ہم نے مضمون ریاضی پرچہ II گروپ سکیم انٹر سیکنڈری امتحان 2016ء کا سوالیہ پرچہ اشاعت شدہ (Subjective & Objective) کو نظر میں چیک کر لیا ہے یہ پرچہ سلیبس کے عین مطابق Set کیا گیا ہے۔ اس سوالیہ پرچہ میں کوئی غلطی نہیں ہے۔ ہم نے سوالیہ پرچہ کا اردو اور انگریزی Version بھی چیک کر لیا ہے یہ Version آپس میں مطابقت رکھتے ہیں اور سلیبس (Syllabus) کے مطابق بھی ہیں۔ نیز اس پرچہ کی Key کی بابت بھی تصدیق کی جاتی ہے کہ یہ بھی درست بنائی گئی ہے۔ اس میں بھی کسی قسم کی کوئی غلطی نہیں ہے۔ مزید یہ کہ ہم نے Key بنانے سے متعلق دفتر کی جانب سے تیار کردہ ہدایات وصول کر کے ان کا بغور مطالعہ کر لیا ہے اور ان کی روشنی میں Key تیار کی ہے۔

PREPARED & CHECKED BY

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ثانوی و اعلیٰ ثانوی تعلیمی بورڈ، پاکستان

موضوع: MATHS تاریخ: 03.11.2016

جملہ ہدایات کے بارے میں Key (مارکس کی)

انٹرنیٹ فرسٹ ایئر ایف ایف ایف 2015
SECTION 1

Q. No. 2

- (i) Finding x and $f'(x)$ 1+1 m.
- (ii) Rationalization and Simplification 1+1 m.
- (iii) $x^\circ = \pi/180$, answer 1+1 m.
- (iv) dy and dy/dx 1+1 m.
- (v) Finding dy/dx 2 m.
- (vi) Finding dy/dx 2 m.
- (vii) Differentiation and finding dy/dx 1+1 m.
- (viii) Differentiation and using chain rule 1+1 m.
- (ix) Applying formula and simplification 1+1 m.
- (x) Differentiation and chain rule 1+1 m.
- (xi) Differentiation and using formula 1+1 m.
- (xii) Finding $f'(x)$ and interval 1+1 m.

Q. No. 3

- (i) Complete solution 2 m.
- (ii) Division and integration 1+1 m.
- (iii) putting $x = a \sin$ and integration 1+1 m.
- (iv) using formula and integration 1+1 m.
- (v) Complete solution 2 m.
- (vi) Completing square and integration 1+1 m.
- (vii) Integration and use of limits 1+1 m.
- (viii) Integration and use of limits 1+1 m.
- (ix) Integration and use of limits 1+1 m.
- (x) Separation of variables and integration 1+1 m.
- (xi) Table of values and graph 1+1 m.
- (xii) graphing and corner points 1+1 m.

- ① Saad Ahmad
- ② H. Yousof
- ③ Kaanur H. Talu
- ④ Noorul Haq

تانیوی و اعلیٰ تانیوی تعلیمی بورڈ، ملتان

03-11-16ء نمبر: (بی) پتہ: II گروپ: I

جملہ ہدایات برائے مارک Key: یو کیو ایم اے ڈی کیو ایم (مارک کیسٹم)

انٹرنیٹ فرسٹ ایئر سالانہ امتحانی سالانہ 2016ء

Q. NO.4

- (i) Apply formula and finding inclination (1+1)
- (ii) Find Slopes and Result. (1+1)
- (iii) finding $y = \frac{1}{2}x + \frac{11}{4}$ (2)
- (iv) Finding the pt (-3,3) is above or below (2)
- (v) Apply Formula and find angle (1+1)
- (vi) finding radius (2)
- (vii) find the position of pt. (5,6) (2)
- (viii) find focus and vertex (1+1)
- (ix) find a and b. find eq. of ellipse. (1+1)
- (x) find magnitude and required result. (1+1)
- (xi) For $\underline{u} \cdot \underline{v} = 0$ and find d. (1+1)
- (xii) For $\underline{a} \times \underline{b} = \begin{vmatrix} i & j & k \\ 2 & -6 & -3 \\ 4 & 3 & -1 \end{vmatrix} = \textcircled{1}$
and required result = $\textcircled{1}$
- (xiii) Apply $\underline{a} \cdot \underline{b} \times \underline{c} = \begin{vmatrix} 1 & -2 & 3 \\ -2 & 3 & -4 \\ 1 & -3 & 5 \end{vmatrix} = \textcircled{1}$
required result $\underline{a} \cdot \underline{b} \times \underline{c} = 0$ $\textcircled{1}$

- ① Saeed Ahmad
- ② CH. Yousaf
- ③ Usman Ali Talib
- ④ Noor ullell

ثانوی و اعلیٰ ثانوی تعلیمی بورڈ، ملتان

موضوع: 03.11.2016 نمبر: MAT11 گروپ: II

جزل ہدایات برائے مارکنگ Key نیو سیکم اولڈ سیکم (مارکنگ سیکم)

انٹرنیٹ فرسٹ ایکنڈ سالانہ امتحان 2016ء

SECTION - II

Q.5 (a), finding $f'(a)$, $f'(a+h)$, Simplification 2+3m
(b), finding dy/dx 3m and proof 2m.

Q.6 (a), Integration 3m and finding constant and answer 2m.

(b) Complete solution 5m.

Q.7 (a), Integration 3m and limit, answer 2m.

(b), finding Feasible points 3m and proving minimization 2m.

Q.8 (a), using points A and B 2m.
Remaining solution 3m.

(b), using triangle law 3m
value of z 2m.

Q.9 (a), using definition 2m
Simplification 3m.

(b), writing unit vectors 2m
moving formulae 3m.

(1)

(2)

(3)

(4)

~~Answer~~

~~Answer~~

~~Answer~~