

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, PESHAWAR

Higher Secondary School Certificate (H.S.S.C.) Examination — Inter Part-I

Inter Part-I	MATHEMATICS PR - XI (A-I-B) (24)	2024
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Instructions (printed in Urdu on the sheet): 1. Each question has four circles; fill in only the circle of the correct answer. 2. Use a blue or black pen to fill the circles. 3. Filling more than one circle will be treated as a wrong answer.

SECTION - A

Time Allowed: 20 Minutes

Marks: 20

1	${}^nC_{n-1} = \underline{\hspace{2cm}}$ ☐ n ☐ n - 1 ☐ n + 1 ☐ n!
2	In the expansion of $(a + b)^5$ the Middle term is _____. ☐ 3 rd ☐ 4 th ☐ 2 nd and 3 rd ☐ 3 rd and 4 th
3	Which of the given is even function? ☐ X^2 ☐ $2x^4$ ☐ $2x^4 - x^2 + 3$ ☐ All these
4	Domain of $f(x) = \frac{x}{x^2 - 16}$ is _____. ☐ $R - \{-4, 4\}$ ☐ R ☐ $\{-4, 4\}$ ☐ $\{0, 4, -4\}$
5	$\cos(\pi + \theta) = \underline{\hspace{2cm}}$ ☐ $\cos\theta$ ☐ $\sin\theta$ ☐ $-\cos\theta$ ☐ $-\sin\theta$
6	$2\sin\alpha\cos\beta = \underline{\hspace{2cm}}$ ☐ $\sin(\alpha + \beta) + \sin(\alpha - \beta)$ ☐ $\sin(\alpha + \beta) - \cos(\alpha + \beta)$ ☐ $\sin(\alpha + \beta) - \sin(\alpha - \beta)$ ☐ $\sin(\alpha + \beta) + \cos(\alpha + \beta)$
7	If a, b, c are the sides of triangle ABC then $a = \underline{\hspace{2cm}}$. ☐ $\frac{b\sin\alpha}{\sin\beta}$ ☐ $\frac{\sin\alpha}{b\sin\beta}$ ☐ $\frac{b\sin\beta}{\sin\alpha}$ ☐ None of these
8	The circum radius of a triangle ABC having sides a, b, c is given by _____. ☐ $r = \frac{s}{\hspace{1cm}}$ ☐ $R = \frac{abc}{4}$ ☐ $R = \frac{\hspace{1cm}}{s - a}$ ☐ $R = \frac{4}{abc}$
9	Period of $\frac{1}{2}\tan 3x$ is _____. ☐ 2π ☐ 6π ☐ $\frac{\pi}{3}$ ☐ $\frac{\pi}{6}$
10	If $f(-x) = -f(x)$ for every 'x' in the domain of f. Then f is called _____. ☐ Odd function ☐ Even function ☐ Constant function ☐ Identity function
11	If Z is any complex number then $ -Z = \underline{\hspace{2cm}}$. ☐ $\sqrt{-a^2 - b^2}$ ☐ $\sqrt{a^2 - b^2}$ ☐ $\sqrt{a^2 + b^2}$ ☐ $\sqrt{b^2 - a^2}$
12	$i^{-9} = \underline{\hspace{2cm}}$. ☐ $\frac{1}{i}$ ☐ $\pm i$ ☐ $\frac{-1}{i}$ ☐ i
13	If $A = \begin{bmatrix} 1 & 2 & 3 \\ 6 & 5 & 4 \\ 7 & 8 & 9 \end{bmatrix}$ then the minor $M_{13} = \underline{\hspace{2cm}}$. ☐ 13 ☐ -13 ☐ -12 ☐ 36
14	If 'A' is a square matrix of order 3, then $A + A^t$ is _____. ☐ Symmetric ☐ Skew symmetric ☐ Zero matrix ☐ Hermitian matrix
15	If $u = 3i - 2j$ then $\hat{u} = \underline{\hspace{2cm}}$. ☐ $\sqrt{13}$ ☐ $\sqrt{13}(3i - 2j)$ ☐ 13 ☐ $\frac{1}{\sqrt{13}}(3i - 2j)$
16	If $V = xi + yi + Zk$ then $ V = \underline{\hspace{2cm}}$. ☐ $\sqrt{x^2 + y^2 + z^2}$ ☐ $x^2 + y^2 + z^2$ ☐ $\sqrt{x^2 + y^2}$ ☐ $\sqrt{i^2 + j^2 + k^2}$
17	Arithmetic Mean between $\frac{1}{3}$ and $\frac{1}{4}$ is _____. ☐ $\frac{7}{24}$ ☐ $\frac{14}{12}$ ☐ $\frac{7}{12}$ ☐ None of these
18	If 3, 9, 27 ____ is G.P then a_6 is _____. ☐ 3^5 ☐ 3^6 ☐ 3^{-5} ☐ 3^{-6}
19	General Term of $1.2^2 + 2.3^2 + 3.4^2 + \underline{\hspace{2cm}}$ is: ☐ $n(n + 1)$ ☐ $n^2(n + 1)$ ☐ $(n + 1)^2$ ☐ $n(n + 1)^2$
20	$\frac{(n - 1)!}{(n + 1)!} = \underline{\hspace{2cm}}$ ☐ $\frac{1}{n + 1}$ ☐ $\frac{1}{n(n + 1)}$ ☐ $(n + 1)$ ☐ $n(n + 1)$

Note: Time allowed for Section – B and Section – C is 2 Hours and 40 minutes.

SECTION – B

Marks: 50

Q2: Attempt any TEN parts. Each part carries FIVE marks.

- i) Separate into real and imaginary parts $\left(\frac{5+2i}{2-3i}\right)^{-1}$
- ii) Solve the quadratic equation $Z^2 - 6Z + 13 = 0$
- iii) Find the rank of $\begin{bmatrix} 1 & 0 & -2 \\ 2 & 2 & 1 \\ -1 & 2 & 3 \end{bmatrix}$
- iv) If $a = 3i - j - k$, $b = -2i + 4j - 3k$, $c = i + 2j - k$. Then find a unit vector parallel to $3a + 2b + 4c$?
- v) Insert three arithmetic means between 6 and 41?
- vi) Find the sum of the n terms of the series $1.2^2 + 2.3^2 + 3.4^2 + \dots$.
- vii) Find 'n' if ${}^{2n}C_3 : {}^nC_2 = 36 : 3$
- viii) Find the middle term in the expansion of $\left(\frac{a}{x} + \frac{x}{a}\right)^8$
- ix) Find the inverse of $f(x) = \frac{2x-1}{x+1}$
- x) Prove that $\frac{1+\cos 2\theta}{\sin 2\theta} = \cot \theta$
- xi) Find Area of Triangle ABC in which $a = 7$, $b = 8$, $c = 2$ are measures of its sides.
- xii) Find the exact value of $\sin\left(\cos^{-1} \frac{\sqrt{3}}{2}\right)$
- xiii) The second term of H.P is $\frac{1}{2}$ and the fifth term is $-\frac{1}{4}$. Find the 12th term.

SECTION – C

Marks: 30

Note: Attempt any THREE questions. Each question carries equal marks.

- Q3 (a) Use Cramer's rule to solve the system $x - 2y + z = 2$, $2x + 2y - z = 4$, $x + y = 0$?
- (b) Let $P = i - 3j + 2k$, $q = i + j$, $r = 2i + 2j - 4k$ then find $|p - q + r|$
- Q4 (a) Convert for x if $1.\overline{63}$ to a common fraction.
- (b) Prove that $\frac{\sin \alpha + \sin \alpha}{\cos \alpha + \cos \alpha} = \tan 5\alpha$
- Q5 (a) Prove by Mathematical Induction $1^2 + 2^2 + 3^2 + \dots + n^2 = n(n+1)(2n+1)/6$
- (b) Find the area of inscribed circle of the triangle with measures of the sides 55m, 25m, 70m.
- Q6 (a) Show that $2\tan^{-1}A = \frac{\tan^{-1} 2A}{1-A^2}$
- (b) Find the value of 'n' when $\frac{n(n!)}{(n-5)!} = \frac{12(n!)}{(n-4)!}$

Notes

1. Typeset from the board paper. Board wording, spelling and notation are reproduced as printed, including slips; nothing has been corrected.
2. The source answer sheet arrived with the bubbles already shaded in. Options are given unmarked; no answer key is included.
3. The Section A instructions are printed in Urdu on the board sheet; an English rendering is given here.
4. The 2024 subjective sheet prints no section totals. Section B (ten parts $\times$ five marks = 50) and Section C (30) are given from the printed part marks and the pattern of the other Peshawar years.
5. Section A Q.8: the Δ symbol did not print on the board sheet — the options read " $r = /s$ ", " $R = abc/4$ " and " $R = /(s - a)$ " with blank or missing Δ . Reproduced as printed.
6. Slips kept as printed: Q.16 " $V = xi + yi + Zk$ " (yi for yj); Q.14 "Hermitian"; Q4(b) " $\sin \alpha \dots \cos \alpha$ " (q for 9); Q6(a) prints the fraction bar under $\tan^{-1} 2A$ with " $1 - A^2$ "; Q3(b) mixes capital P and lowercase p.