

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, PESHAWAR

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

Inter Part-I	MATHEMATICS Paper – XI (SE) (20) · PR XI (SE) 20	Reappear 2020
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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	If $Z = 3 + 4i$, then $ Z = \dots\dots$ ☐ 25 ☐ 16 ☐ 5 ☐ $3 + 4i$
2	$\dots\dots$ matrix is a non-singular matrix. ☐ Identity ☐ Zero ☐ Every ☐ Every triangular
3	$P(A/B) = \dots\dots\dots$ ☐ $\frac{P(A \cap B)}{P(A)}$ ☐ $\frac{P(A \cap B)}{P(B)}$ ☐ $\frac{P(A \cup B)}{P(A)}$ ☐ $P(A) - P(B)$
4	Solution of $2x + 5 \geq x - 3$ is..... ☐ $x = 8$ ☐ $x = -8$ ☐ $x \geq 8$ ☐ $x \geq -8$
5	The n th term of the sequence 3, 6, 9, 12, ... is ☐ $n + 3$ ☐ $2n + 1$ ☐ $4n - 1$ ☐ $3n$
6	If $\bar{b}$ is parallel to $\bar{a}$ then..... ☐ $\bar{b} \cdot \bar{a} = 0$ ☐ $\bar{b} + \bar{a} = 0$ ☐ $\bar{b} = k\bar{a}$ ☐ $\bar{b} - \bar{a} = 0$
7	The y-intercept of the parabola $f(x) = x^2 + 6x - 5$ is at..... ☐ (3, 0) ☐ (0, 3) ☐ (0, -5) ☐ (0, 5)
8	If X is the G.M between 'a' and 'b', then a, X, b forms..... ☐ A.P ☐ G.P ☐ H.P ☐ Both A and C
9	The number of terms in the expansion of $(1 + x)^{2n}$ are ☐ n ☐ $n + 1$ ☐ $2n + 1$ ☐ $2(n + 1)$
10	$f(x) = \frac{2x}{x-1}$ is not defined at $x = \dots\dots$ ☐ 2 ☐ 0 ☐ -1 ☐ 1
11	$\sin(t)\cos(4t) + \cos(t)\sin(4t) = \dots\dots\dots$ ☐ $\sin(3t)$ ☐ $\cos(3t)$ ☐ $\cos(5t)$ ☐ $\sin(5t)$
12	All trigonometric functions are positive in quadrant..... ☐ 2 nd ☐ 4 th ☐ 3 rd ☐ 1 st
13	$\dots\dots$ term is the middle term in the expansion of $(x - y)^{-5}$ ☐ 5 th ☐ 5 th and 6 th ☐ 6 th ☐ None of these
14	Which of the given doesn't hold in general in case of matrices A and B? ☐ $A + B = B + A$ ☐ $(AB)^{-1} = B^{-1} A^{-1}$ ☐ $(AB)^t = B^t A^t$ ☐ $AB = BA$
15	$\frac{b}{2\sin(\beta)} = \dots\dots\dots$ ☐ r ☐ R ☐ S ☐ Area of triangle
16	$\cos(\pi - \beta) = \dots\dots\dots$ ☐ $\cos \beta$ ☐ $-\cos \beta$ ☐ $\sin \beta$ ☐ $-\sin \beta$
17	Domain of $f(x) = \frac{1}{x}$ is..... ☐ R ☐ $R - \{0\}$ ☐ Q ☐ Z
18	${}^nC_r = \dots\dots\dots$ ☐ ${}^nP_r$ ☐ $r {}^nP_r$ ☐ $r P_n$ ☐ $\frac{1}{r!} {}^nP_r$
19	For co-planar vectors $\bar{x}$, $\bar{y}$ and $\bar{z}$ we have $\bar{z} \cdot \bar{x} \times \bar{y} = \dots\dots\dots$ ☐ 0 ☐ $\bar{0}$ ☐ 1 ☐ None of these
20	$ i^{23} = \dots\dots\dots$ ☐ i ☐ $\sqrt{-1}$ ☐ 1 ☐ -1

Note: Time allowed for Section - B and Section - C is 2 Hours and 40 minutes.**SECTION - B**

Marks: 50

Q-II Answer any TEN parts. Each part carries FIVE marks.

1. Factorize $P(z) = z^2 + 4$
2. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 1 \end{bmatrix}$ verify that $((A^{-1}))^t = ((A^t))^{-1}$
3. Find c if $\bar{a} = i + 2j + 3k$, $\bar{b} = 2i - 3j + 4k$, $\bar{c} = 3i + j + ck$ are collinear.
4. Show that sum of first positive odd integers is n^2 .
5. Show that $\binom{n}{r} + \binom{n}{r-1} = \binom{n+1}{r}$
6. Find the middle term in the expansion of $\left(\frac{a}{x} + \frac{x}{a}\right)^{10}$
7. Find the inverse function of $f(x) = 3 + \sqrt{2x}$
8. Graph the system of linear inequalities $2x - 3y \leq 12$, $3x + 2y \leq 6$
9. Prove that $\sin(\alpha + \beta) + \sin(\alpha - \beta) = 2\sin \alpha \cos \beta$
10. For any triangle show that $r_1 + r_2 + r_3 = 4R + r$.
11. Find the area of the triangle ABC if its sides are $a = 7$, $b = 8$, $c = 2$
12. $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$
13. Find the general solution of $\sqrt{3} \cos x - \sin x = 0$

SECTION - C

Marks: 30

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

- Q-III (a) Separate into real and imaginary parts $\left(\frac{\sqrt{3}-i}{\sqrt{3}+i}\right)^2$
- (b) If $\frac{x}{3} + \frac{x^2}{3^2} + \frac{x^3}{3^3} + \dots$ where $0 < x < 3$ then show that $x = \frac{3y}{1+y}$
- Q-IV Find the maximum and minimum values of $f(x, y) = 7x + 21y$ subject to the constraints $2x + y \geq 2$, $2x + 3y \leq 6$, $x + 2y \leq 8$, $x \geq 0$, $y \geq 0$.
- Q-V (a) Solve by Cramer's rule $x - 2y = 4$, $3x + y = -5$, $2x + z = -1$
- (b) Prove by mathematical induction $\binom{3}{3} + \binom{4}{3} + \binom{5}{3} + \dots + \binom{n+2}{3} = \binom{n+3}{4}$
- Q-VI (a) Prove that in any triangle ABC $r = 4R \sin\left(\frac{\alpha}{2}\right) \sin\left(\frac{\beta}{2}\right) \sin\left(\frac{\gamma}{2}\right)$
- (b) Draw the graph of $y = \sin x$, where $0 \leq x \leq 2\pi$

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. This is the 2020 supplementary (reappear) sitting: the objective sheet is headed "Mathematics Paper - XI (SE) (20)" and the subjective "PR XI (SE) 20 — Mathematics (New), Inter Part-I (Reappear)". The candidate name and roll number on the source answer sheet are omitted.
5. Printed as shown on the board sheet: Q-III(b) gives the series without "y =" before it; Q-V(b) has a stray "+" after the equals sign; Section A Q.13 prints the exponent as -5; Section B Q.4 "sum of first positive odd integers" omits "n"; "Cramer's".
6. Q-IV is printed as a single question with no (a)/(b) parts.