

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, PESHAWAR

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

Inter Part-I	MATHEMATICS Paper – XI (01) (19) · PR XI (01) 19	Fresh / Reappear 2019
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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	Period of $\sec(3x)$ is.....	☐ π	☐ 0	☐ 2π	☐ $\frac{2\pi}{3}$
2	The graph of $y = 2x^2 + 1$ is.....	☐ Parabola	☐ circle	☐ straight line	☐ None of these
3	The amplitude of $5\sin(2x)$ is.....	☐ 1	☐ -5	☐ 5	☐ 10
4	The inverse function of $f(x) = \frac{x}{x-1}$ is...	☐ $\frac{x-1}{x}$	☐ $\frac{x+1}{x-1}$	☐ $\frac{x}{1-x}$	☐ $\frac{x}{x-1}$
5	When $x = 5$, then $\frac{7! \times 6!}{x! \times (x+1)!} = \dots$	☐ 36	☐ 42	☐ 7	☐ 7!
6	$1 - x + x^2 - x^3 + \dots$ is the expansion of...	☐ $(1-x)^{-2}$	☐ $(1-x)^{-1}$	☐ $(1+x)^{-2}$	☐ $(1+x)^{-1}$
7	If $\vec{c}$ lies in the plane of $\vec{a}$ and $\vec{b}$, then $\vec{c} = \dots$	☐ $\alpha\vec{a} + \beta\vec{b}$	☐ $\alpha\vec{a} \times \beta\vec{b}$	☐ $\alpha\vec{a} \cdot \beta\vec{b}$	☐ $\vec{0}$
8	The domain of $f(x) = \sqrt{x+1}$ is the set of all.....	☐ $x > 0$	☐ $x > 1$	☐ $x \geq -1$	☐ $x < -1$
9	The solution of linear inequality $3x - 2 \geq 8 + 5x$ is.....	☐ $[-\infty, -5]$	☐ $(-\infty, -5]$	☐ $[-\infty, 5)$	☐ $[-\infty, -5]$
10	In right angled $\triangle ABC$ $\alpha = 57^\circ$ then $\beta = \dots$	☐ 57°	☐ 90°	☐ $33'$	☐ 33°
11	The multiplicative inverse of $Z = 2 + 3i$ is.....	☐ $2 - 3i$	☐ $-2 - 3i$	☐ $\frac{2}{13} - \frac{3}{13}i$	☐ $\frac{2}{13} + \frac{3}{13}i$
12	Let $A = \begin{bmatrix} 3 & -2 \\ 5 & 7 \end{bmatrix}$. Then the co-factor of -2 is.....	☐ -5	☐ 2	☐ -2	☐ 5
13	The direction cosines of $\vec{a} = 2\vec{i} - \vec{j} + \vec{k}$ are.....	☐ 2, 1, -1	☐ 2, -1, 1	☐ $\frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}$	☐ $\frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{-1}{\sqrt{6}}$
14	Let $A^2 = A$, then $\sum_{j=1}^3 A^j = \dots$	☐ A	☐ 2A	☐ A^3	☐ 3A
15	$\sum_{k=1}^n K^2 = \dots$	☐ $\frac{n(n+1)}{2}$	☐ $\frac{n(n+1)(2n+1)}{6}$	☐ $[\frac{n(n+1)}{2}]^2$	☐ None of these
16	A fair die is rolled, the probability that even integer will occur is.....	☐ $\frac{1}{2}$	☐ $\frac{1}{3}$	☐ $\frac{1}{4}$	☐ $\frac{1}{6}$
17	The A.M between 6 th and 8 th term of the A.P 1, 4, 7, 10, ... is.....	☐ 16	☐ 22	☐ 19	☐ 48
18	The vector perpendicular to $-\vec{i} + 2\vec{j} + \vec{k}$ and $3\vec{i} - \vec{k}$ is.....	☐ $5\vec{i} - \vec{j} - 3\vec{k}$	☐ $-5\vec{i} - \vec{j} - 3\vec{k}$	☐ $-5\vec{i} + \vec{j} + 3\vec{k}$	☐ None of these
19	If $\frac{p}{q}$ is the third term of an H.P, then third term of corresponding A.P will be	☐ $\frac{p}{q}$	☐ $\frac{q}{p}$	☐ $[\text{under watermark}]$	☐ $-\frac{p}{q}$
20	Coefficient of third term in the expansion of $[\text{expression illegible on scan}]$ is.....	☐ 7	☐ 14	☐ 56	☐ 9

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. If $Z_1 = 1 + 3i$, $Z_2 = 2 + 3i$ evaluate $\frac{|Z_1|}{|Z_2|}$
2. For what value of λ the homogeneous system $x + 5y + 3z = 0$, $5x + y - \lambda z = 0$, $x + 2y + \lambda z = 0$ has non-trivial solution.
3. Solve the triangle for which $a = 9$, $b = 7$, $c = 5$.
4. Find the unit vector perpendicular to both $\vec{a} = i + j + 2k$ and $\vec{b} = -2i + j - 3k$
5. For a G.P $a_{10} = \ell$, $a_{13} = m$, $a_{16} = n$ show that $\ell n = m^2$
6. Given $a_n = 201$ for the A.P 5, 9, 13, ... Find n .
7. Find the area of the inscribed circle of the triangle with measures of the sides 55m, 25m, 70m.
8. Solve for 'n' ${}^{n+1}C_4 = 6 \cdot {}^{n-1}C_2$
9. Prove by mathematical induction $5 + 10 + 15 + \dots + 5n = \frac{5n(n+1)}{2}$
10. Find (without graphing), the vertex, intercepts and axis of $f(x) = x^2 + 2x - 3$.
11. Prove the identity $\frac{\sin(\alpha) + \sin(9\alpha)}{\cos(\alpha) + \cos(9\alpha)} = \tan(5\alpha)$
12. Verify that $(AB)^{-1} = B^{-1} A^{-1}$, when $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 1 \\ 2 & 3 \end{bmatrix}$
13. Graph $y = -\cos(x)$ in $0 \leq x \leq 2\pi$

SECTION - C

Marks: 30

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

- Q-III (a) Find the period, frequency, maximum and minimum value of the function $y = 5 - 4 \sin(\theta + 30)$
 (b) Show that $\tan^{-1} \frac{3}{4} + \tan^{-1} \frac{8}{19} = \frac{\pi}{4}$
- Q-IV (a) IF x^4 and higher powers be neglected, then show that $(1 + x)^{1/4} + (1 - x)^{1/4} = a - bx^2$. Find also 'a' and 'b'.
 (b) Show by mathematical induction that $\frac{3^{2n} - 2^{2n}}{5}$ is an integer for all positive integers.
- Q-V (a) Prove that ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$
 (b) What is the smallest angle of a triangle whose sides measure 25, 18 and 21 ft?
- Q-VI (a) Solve the system of equation $2x + 3y - z = 10$, $x - 2y - 2z = -4$, $3x + y + z = 7$ by Gauss elimination method.
 (b) Show that $f(x) = x\sqrt{x^2 + 3}$ is odd function.

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. **Left marked rather than guessed** (fully under the watermark or a candidate's markings, unrecoverable at any zoom on this 825-px scan): Section A Q.19 third option; the expression in Section A Q.20; the coefficient of y in Q-VI(a).
5. Read as probable: Section A Q.8 fourth option ($x < -1$), Q.13 fourth option (sign of the last cosine), Q.18 third option ($-5i + j + 3k$). A cleaner scan of the objective sheet would settle all of these.
6. Section A Q.19 and Q.20 are printed without a separating line on the source; Q.20 is unnumbered there and numbered 20 here.