

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) (17) · PR XI (01) 17	Fresh / Reappear 2017
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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	$(-i)^{23} = \dots$ ☐ $-i$ ☐ i ☐ 1 ☐ -1
2	If in a square matrix A, $A^t = -A$, then the matrix A is called..... ☐ Singular ☐ Non singular ☐ Symmetric ☐ Skew symmetric
3	A square matrix $A = \begin{bmatrix} 2 & 0 \\ 0 & 3 \end{bmatrix}$ is a matrix. ☐ Scalar ☐ Row ☐ Column ☐ Diagonal
4	In matrix multiplication the property do not hold. ☐ Associative ☐ Commutative ☐ Distributive ☐ Inverse
5	If a matrix A is singular, then the system $Ax = B$ has solution. ☐ Unique ☐ An infinite ☐ No ☐ None of these
6	If $\vec{a}$ is a vector then the unite vector denoted as $\hat{a} = \dots$ ☐ $\hat{a} a $ ☐ $\frac{ a }{a}$ ☐ $\hat{a} + a $ ☐ $\frac{\vec{a}}{ a }$
7	If $\vec{a}$ and $\vec{b}$ are two vectors, then the length of $(\vec{a} \times \vec{b})$ is $ a \times b = \dots$ ☐ $ a b \cos\theta$ ☐ $ a b \sin\theta \hat{n}$ ☐ $ a b \sin\theta$ ☐ $ a b \cos\theta \hat{n}$
8	If α, β, γ are the direction angles of vector $\vec{r}$, then $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = \dots$ ☐ 1 ☐ Zero ☐ -1 ☐ $\frac{\pi}{2}$
9	If A, G and H are the A. Mean, G. Mean and Harmonic Mean then..... ☐ $A > H > G$ ☐ $G > H > A$ ☐ $A < G > H$ ☐ $A > G > H$
10	When a coin is tossed then the probability of getting head is..... ☐ $\frac{1}{3}$ ☐ $\frac{1}{2}$ ☐ $\frac{1}{4}$ ☐ $\frac{1}{6}$
11	If A and B are mutually exclusive events, then $P(A) + P(B) = \dots$ ☐ $P(A \cup B)$ ☐ $P(A \cap B)$ ☐ $P(A - B)$ ☐ $P(A + B)$
12	The fourth term of the sequence $a_n = (-1)^n \frac{n+1}{n}$ is..... ☐ $\frac{3}{4}$ ☐ $\frac{-4}{5}$ ☐ $\frac{5}{6}$ ☐ $\frac{5}{4}$
13	A function $f : x \rightarrow y$ is said to be if each element of y is the image of some element in x. ☐ Injective ☐ Surjective ☐ Bijective ☐ One - one
14	If $f(-x) = -f(x)$ then the function is called an function. ☐ Odd ☐ Even ☐ Identity ☐ Linear
15	The an equality $n^2 > n + 3$ is true for..... ☐ $n = 1$ ☐ $n = 2$ ☐ $n = 3$ ☐ $n = 0$
16	$\cos \frac{\theta}{2} = \dots$ ☐ $\sqrt{\frac{1 - \cos\theta}{2}}$ ☐ $\sqrt{\frac{1 + \cos\theta}{2}}$ ☐ $\sqrt{\frac{1 - \sin\theta}{2}}$ ☐ $\sqrt{\frac{1 + \sin\theta}{2}}$
17	$2\cos\left(\frac{\theta + \varphi}{2}\right) \sin\left(\frac{\theta - \varphi}{2}\right) = \dots$ ☐ $\sin\theta + \sin\varphi$ ☐ $\sin\theta - \sin\varphi$ ☐ $\cos\theta + \cos\varphi$ ☐ $\cos\theta - \cos\varphi$
18	2π is the period of ☐ $\operatorname{Cosec}\theta$ ☐ $\sec \theta$ ☐ $\cot \theta$ ☐ A and B
19	The reciprocal of the period is called the of the function. ☐ Amplitude ☐ Wave length ☐ Frequency ☐ Inverse period
20	$\sec^{-1}x = \dots$ ☐ $\cos^{-1}\left(\frac{1}{x}\right), x \neq 0$ ☐ $\cos^{-1}(x)$ ☐ $\frac{1}{\cos x}$ ☐ $\frac{1}{\cos^{-1}x}$

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. Separate into real and imaginary parts of $Z = (2a - bi)^{-2}$.
2. Solve for x $\begin{vmatrix} x & 2 & 3 \\ 0 & -1 & 1 \\ 0 & 4 & 5 \end{vmatrix} = 9$.
3. Find the coordinates of point P if $|\overline{OP}| = 6$ and $\overline{OP}$ is in the direction of $2i - 3j + 6k$.
4. If in an A.P., $a_{[?]} = 43$, $a_{[?]} = 7$ find $a_{[?]}$.
5. Find the sum S_n of the first n terms of the sequence $\left\{\left(\frac{1}{2}\right)^n\right\}$.
6. Find n: $\frac{n!}{(n-4)!} : \frac{(n-1)!}{(n-4)!} = 9 : 1$
7. A sample space $S = (A \cup B)$. $P(A) = 0.75$ and $P(B) = 0.65$ Find $P(A \cap B)$.
8. Show by mathematical induction that $\frac{3^{2n} - 2^{2n}}{5}$ is an integer
9. $f(x) = \frac{x-1}{x-4}$, $x \neq 4$ find the domain and range of f^{-1} .
10. Graph the system of linear equations $2x + y \leq 8$
 $x + y \leq 6$
 $y \geq 0$
11. Prove $\operatorname{Cosec} 2\alpha - \cot 2\alpha = \tan \alpha$.
12. If a cone is 8.4 cm high and has a vertical angle of 72° , Calculate the diameter of its base.
13. Show that $r_1 r_2 r_3 = rS^2$

SECTION - C

Marks: 30

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

- Q-III (a) Show that $\begin{vmatrix} y \cos \theta & 0 & y \sin \theta \\ 1 & 1 & 0 \\ -\sin \theta & 0 & \cos \theta \end{vmatrix} = y$
- (b) If $\vec{a} = 3i - j - k$, $\vec{b} = -2i + 4j - 3k$, $c = i + 2j - k$, then find a unite vector parallel to $3a + 2b + 4c$.
- Q-IV (a) Show that the sum of the first n positive odd integers is n^2
- (b) The sum of an infinite geometric series is 15 and the sum of their squares is 45. Find the series.
- Q-V (a) Find n when ${}^{2n}C_3 : {}^nC_2 = 36 : 3$.
- (b) Find the sum to infinity $1 + 2 \cdot \frac{1}{3} + 3 \cdot \frac{1}{3^2} + 4 \cdot \frac{1}{3^3} + \dots$
- Q-VI (a) Prove that $\frac{\cot^2 \beta - 1}{\operatorname{Cosec}^2 \beta} = \cos 2\beta$.
- (b) Find the area of the inscribed circle of the triangle whit measures of the sides 55m, 25m and 70m.

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 2017 objective sheet prints no question numbers; they are numbered 1-20 here in printed order.
5. **Left marked rather than guessed:** the three subscripts in Section B Q.4 are illegible on this faded scan. Section B Q.1's exponent is read as -2 and Q.9's function as $(x - 1)/(x - 4)$; both are faint and should be checked against a cleaner copy.
6. Kept as printed: "unite vector" (Section A Q.6 and Q-III(b)), "Harmonic", "The an equality", "do not hold", "system of linear equations" for inequalities (Section B Q.10), "whit measures".