

KENDRIYA VIDYALAYA SITAPUR (SHIFT -1)
Unit Test -01 (2024-25)
Class : XI
Mathematics (Code-041)

Time Allowed:90 minutes

Maximum Marks :40

General Instructions:

1. This question paper contains five sections – A, B, C, D and E. Each part is compulsory.
2. Section A has 8 multiple choice type questions and 1 assertion reasoning question of 1 mark each.
3. Section- B has 4 short answer type questions of 2 marks each.
4. Section- C has 3 short answer type questions of 3 marks each.
5. Section- D has 2 long answer type questions of 5 marks each.
6. Section- E has 1 case based question of 4 marks.
7. There is an internal choice in some of the questions.

Q.NO.	SECTION – A (Multiple Choice Questions)	Marks
1.	If $A \cap B' = \emptyset$ then (a) $A \subset B$ (b) $B \subset A$ (c) $A = B$ (d) none of these	1
2.	If $[x]^2 - 5[x] + 6 = 0$, where $[\]$ denote greatest integer function, then (a) $x \in [3,4]$ (b) $x \in (2, 3]$ (c) $x \in [2,3]$ (d) $x \in [2, 4)$	1
3.	If $\alpha + \beta = \frac{\pi}{4}$, then the value of $(1 + \tan \alpha)(1 + \tan \beta)$ is (a) 1 (b) 2 (c) -2 (d) None of these	1
4.	The conjugate of $(5 + 2i)^2$ is (a) $5 - 2i$ (b) $21 - 20i$ (c) $6 - 17i$ (d) None of these	1
5.	The number of subsets of a set containing 5 elements is (a) 10 (b) 25 (c) 32 (d) none of these	1
6.	If $\left(\frac{x}{2} + 1, y - \frac{2}{3}\right) = \left(\frac{3}{2}, \frac{1}{3}\right)$, the value of $2x + y$ will be (a) 4 (b) 3 (c) 0 (d) None of these	1
7.	The greatest value of $\sin x \cos x$ is (a) 1 (b) 2 (c) $\sqrt{2}$ (d) $\frac{1}{2}$	1
8.	If $z = \frac{1}{(2+3i)^2}$ then $ z =$ (a) $1/\sqrt{13}$ (b) $1/13$ (c) $\sqrt{13}$ (d) 13	1
9	In the following question, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	1

	<p>Assertion (A): If $A = \{1,2,3\}$, $B = \{2,4\}$, then number of relation from A to b is equal to 32.</p> <p>Reason (R): The total number of relation from set A to set B is equal to $2^{n(A).n(B)}$.</p>	
	SECTION B	
10	<p>Find the value of $\sin\left(\frac{-11\pi}{3}\right)$ OR</p> <p>A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?</p>	2
11	<p>Let $A = \{1,2,3 \dots \dots \dots 14\}$. Define a relation R from set A to A by</p> <p>$R = \{(x,y) : 3x - y = 0, \text{ where } x,y \in A\}$. Write down the domain, co domain and range.</p>	2
12	Find the multiplicative inverse of: $\frac{5+2i}{3+i}$ in a+ib form	2
13	Solve for x and y: $(x + iy)(2 - 3i) = 4 + i$	2
	SECTION C	
14	Let A and B be two sets. If $A \cap X = B \cap X = \emptyset$ and $A \cup X = B \cup X$ for some set X, show that $A = B$.	3
15	<p>Find domain and range of the function $f(x) = \sqrt{9 - x^2}$</p> <p>OR</p> <p>Find domain and range of the function $f(x) = \frac{x^2}{1 + x^2}$</p>	3
16	If $\tan x = \frac{-4}{3}$, x lies in quadrant II, Find the value of $\sin \frac{x}{2}, \cos \frac{x}{2}$ and $\tan \frac{x}{2}$.	3
	SECTION D	
17.	<p>Prove that: $\cos^2 x + \cos^2 \left(x + \frac{\pi}{3}\right) + \cos^2 \left(x - \frac{\pi}{3}\right) = \frac{3}{2}$</p> <p>OR</p> <p>Prove that: $\cos 2x \cos \frac{x}{2} - \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$</p>	5
18	Find real θ such that $\frac{3+2i \sin \theta}{1-2i \sin \theta}$ is purely real.	5
	SECTION E (CASE BASED QUESTION)	
19	<p>A , B and C are three sets and U is the universal set given as follows:</p> <p>$A = \{ 1, 2, 3, 5, 7, 9\}$</p> <p>$B = \{ 2, 4, 6, 8\}$</p> <p>$C = \{2, 3, 5, 7\}$</p> <p>And $U = \{ 1, 2, 3, \dots\dots\dots, 10\}$ Then</p> <p>(a) Represent the above set in the form of Venn diagram.</p> <p>(b) Find $(A \cup B) - (A \cap C)$</p> <p>(c) Verify that $(A \cup B)' = (A' \cap B')$</p>	1+1+2