UNIT TEST II (2023-24)
MATHEMATICS (CODE-041)

CLASS: XI   **MAX. MARKS: 20**
DATE: 15/01/24   **TIME: 40 MINUTES**

General Instructions:

1. This Question paper contains - four sections A, B, C and D. Each section is compulsory.
   However, there are internal choices in some questions.
2. Section A has 4 MCQ's and 1 Assertion-Reason based questions of 1 mark each.
3. Section B has 2 Very Short Answer (VSA)-type questions of 2 mark each.
4. Section C has 2 Short Answer (SA)-type questions of 3 mark each.
5. Section D has 1 Long Answer (LA)-type questions of 5 marks.

	SECTION – A
	(Multiple Choice Questions) Each question carries 1 mark
1.	For parabola $y^2 = -8x$, the focus and directrix are (a) F (-2,0), x = 2 (b) F(2,0), x = -2 (c) F(2,0), x = 2 (d) F(-2,0), x = -2
2.	The foci of the ellipse are $(0, \pm 5)$ and the length of its major axis is 20. (a) $\frac{x^2}{25} + \frac{y^2}{40} = 1$ (b) $\frac{x^2}{75} + \frac{y^2}{100} = 1$ (c) $\frac{x^2}{25} + \frac{y^2}{100} = 1$ (d) not defined
3.	The $\lim\limits_{x \to 0} \dfrac{x}{\cos x}$ (a) 1 (b) $\frac{\pi}{2}$ (c) 0 (d) not defined
4.	Find $\frac{d}{dx}\left(\frac{1}{x} + \sqrt{x}\right)$ (a) $-\frac{1}{x^2} + 2\sqrt{x}$ (b) $\frac{1}{x^2} + 2\sqrt{x}$ (c) $\frac{-1}{x^2} + \frac{1}{2\sqrt{x}}$ (d) $x^2 + 2\sqrt{x}$
5.	Assertion – Reason based question 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 correct explanation of A (b) Both A and R are true and R is not correct explanation of A (c) A is true but R is false (d) A is false but R is true Assertion (A) : The arithmetic mean between two numbers is 34 and their geometric mean is 16. The numbers are 64 and 4. Reason (R) : For two numbers a and b, A.M. = $\frac{a+b}{2}$ and G.M.= ab
	SECTION – B
	[This section comprises of very short answer type questions (VSA) of 2 marks each]
6.	If a parabolic reflector is 20 cm in diameter and 5 cm deep, find its focus. [OR] Find area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.
7.	Which term of the G.P. 5, 10, 20, 40…….is 5120

SECTION – C

[This section comprises of very short answer type questions (SA) of 3 marks each]

8.	Find the equation of the hyperbola whose foci are $(0, \pm 12)$ and length of its latus rectum is 36.
9.	The sum of the first three terms of a G.P is $\frac{13}{12}$ and product is -1. Find the numbers. [OR] Find the sum 0.5 + 0.55 + 0.555 + 0.5555 + ...upto n terms

SECTION – D

[This section comprises of long answer type questions (LA) of 5 marks]

10.	If $y = \frac{1-\tan x}{1+\tan x}$, show that $\frac{dy}{dx} = \frac{-2}{1+\sin 2x}$ [OR] Do as directed. (a) Find the derivative of y = $\left(\frac{1}{x} + \sqrt{x}\right)\left(\frac{1}{x} - \sqrt{x}\right)$ (b) Find the derivative of f(x) = sin x from first principle.