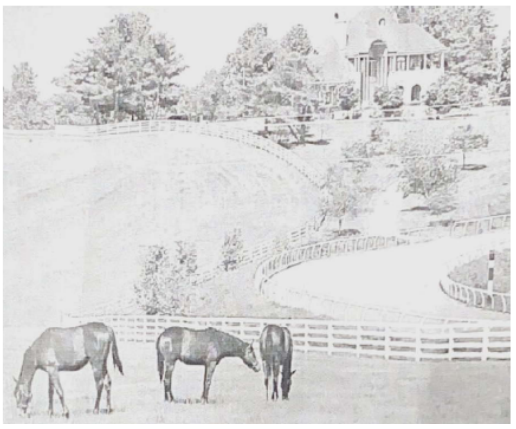
CBT CLASS XI MATHS AUGUST 2024-25

GENERAL INSTRUCTION :

CHAPTER: RELATION AND FUNCTION & TRIGONOMETRIC FUNCTIONS

Sr.No	Question	Marks
	Case Study 1 A company is designing a delivery drone that can carry packages up to a certain weight. The weight of a package (in kilograms) is the input for a function that determines the maximum flight time (in minutes) the drone can achieve with that weight. Function: $f(x) = 30 - 2x$ (where x is the weight of the package in kilograms)	
1	Which of the following correctly describes the domain and range of the function in the context of the delivery drone? a) Domain: $\{x \in R \mid x \geq 0\}$, Range: $\{y \in R \mid y \leq 30\}$ b) Domain: $\{x \in R \mid x \leq 15\}$, Range: $\{y \in R \mid y \geq 0\}$ c) Domain: $\{x \in R \mid x \geq 0\}$, Range: $\{y \in R \mid y \geq 15\}$ d) Domain: $\{x \in R \mid x \leq 15\}$, Range: $\{y \in R \mid 0 \leq y \leq 30\}$	1
2	$F(x) = 30 - 2x$ is called (a) Linear Function (b) Polynomial Function (c) Modulas Function (d) Identity Function	1
3	Instead of $F(x) = 30 - 2x$ if $F(x)$ defined as $32 - 2x^2$ than domain is (a) [-4,4] (b) (-4,4) (c) [0,4] (d) (0,4)	1
4	Range of $32 - 2x^2$ (a) [-32,0] (b) (-32,0) (c) [0,32] (d) (0,32)	1
	Case Study 2 After retirement, Mr. D. N. Sharma purchased a farm house in shape of quadrilateral ABCD with $\angle A = 90°$, $\angle B = 72°$, $\angle C = 108°$ and $\angle D = 90°$. He also purchased a horse and cow. One day, he tied the horse with a rope at vertex B and oserved that it describes an arc of length 88 m when it moves along a circular path keeping the rope tight. 	

5	What is radian measure of ∠ B ? **(a)** 3π/5 **(b)** π/5 **(c)** 2π/3 **(d)** 2π/5	
6	What is length of rope? **(a)** 70 m **(b)** 80 m **(c)** 72 m **(d)** 60 m	
7	What will be the length of arc described by horse if he doubles the rope length? **(a)** 172 m **(b)** 176 m **(c)** 175 m **(d)** 178 m	
8	What will be the length of arc described by cow if it is tied at vertex C with the rope of same length as horse? **(a)** 140 m **(b)** 132 m **(c)** 144 m **(d)** 142 m	
	Directions: (Q.9 – Q.10) Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options (a) , (b) , (c) and (d) given below : **(a) A is true , R is true and R is a correct explanation for A** **(b) A is true , R is true and R is not a correct explanation for Assertion** **(c) A is true and R is false** **(d) A is false and R is true**	
9	**Assertion:** If (x + 1, y – 2) = (3, 1), then x = 2 and y = 3. **Reason:** Two ordered pairs are equal, if their corresponding elements are equal. **(a)** **(b)** **(c)** **(d)**	1
10	**Assertion:** cosec *x* is negative in third and fourth quadrants. **Reason:** cot *x* decreases from 0 to – ∞ in first quadrant and increases from 0 to ∞ in third quadrant. **(a)** **(b)** **(c)** **(d**	1

Answer Key

Ans1	The best option is (d) Domain: {x ∈ R | x ≤ 15}, Range: {y ∈ R | 0 ≤ y ≤ 30}.
Feedback	Negative value of x& f(x) is not possible so f(x) ≥ 0 i. e. x ≥ 0 & 30 – 2x ≥ 0
Ans2	Ans: (a)
Feedback	Maximum power of x is 1

Ans3	Ans: (c)
Feedback	$f(x) = 32 - 2x^2$, Negative value of x& f(x) is not possible so $f(x) \geq 0$ i. e. $x \geq 0$ & $32 - 2x^2 \geq 0$
Ans4	Ans: (c)
Feedback	Negative value of f(x) is not possible so $32 \geq f(x) \geq 0$
Ans5	**(d)** $2\pi/5$
Feedback	radian measure of $\angle$ B = 72 x $\frac{\pi}{180}$
Ans6	**(a)** 70 m
Feedback	length of rope = $88/(2\pi/5)$ [$r = l/\theta$]
Ans7	**(b)** 176 m
Feedback	length of arc described by horse =140 x $(2\pi/5)$ [$l = r\,\theta$]
Ans8	**(b)** 132 m
Feedback	length of arc described by cow = 70 x $(3\pi/5)$ [$l = r\,\theta$]
Ans9	**(a)**
Feedback	A is true , R is true and R is a correct explanation for A
Ans10	**(c)**
Feedback	**A is true and R is false because** cot *x* decreases from ∞ to 0 in first quadrant