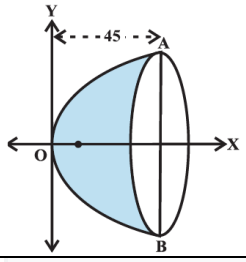
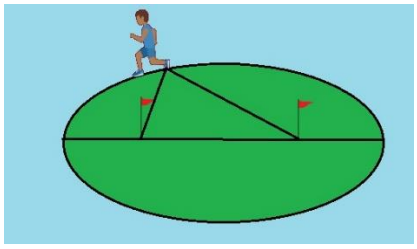
CBT CLASS XI MATHS DECEMBER-2023

GENERAL INSTRUCTION :

CHAPTER: CONIC SECTION

Sr.No	Question	Marks
	Parabolic mirror A parabolic mirror is a concave mirror that has been precisely constructed to capture as well as focus energy on some kind of specified spot. They are, however, only used to transport energy from one area to another. A concave reflecting surface being utilized transmit as well as gather energy or radiation such as lighting, noise, or radio frequency. The difference is that a concave mirror has a spherical surface, but a parabolic mirror has a parabolic surface with less spherical aberration. Parabolic mirrors are commonly employed in astronomical telescopes to reduce spherical aberration and improve image clarity. **Application of parabolic mirrors** Parabolic mirrors are used in the following applications: Solar cookers. Reflecting telescope. Satellite dishes. Therefore, a parabolic mirror is a mirror that has been carefully designed to gather and focus energy on a single point. They are also utilized to transfer energy from one location to another. **Case Study 1** The focus of a parabolic mirror as shown in following figure is at a distance of 5 cm from its vertex. on the basis of these information give the answer of following questions  	
1	**Equation of parabolic mirror is** (a) $y^2 = 5x$ (b) $y^2 = -20x$ (c) $y^2 = 20x$ (d) $y^2 = 15x$	1
2	**Focus of parabolic mirror is** (a) (5,0) (b) (20,0) (c) (10,0) (d) (15,0)	1
3	**Latus rectum of parabolic mirror is** (a) 5 (b) 10 (c) 15 (d) 20	1
4	**If the mirror is 45 cm deep shown in above figure than find value of AB** (a) 60 cm (b) 45 cm (c) 30 cm (d) 15 cm	1

	Case Study 2 A man running a race course notes that the sum of the distances from the two flag posts from him is always 10 m and the distance between the flag posts is 8 m. The equation of the posts traced by the man is $x^2/25 + y^2/9 = 1$, on the basis of these information give the answer of following questions 	
5	**Length of major axis and minor axis is** (a) 10, 8 (b) 10, 3 (c) 5, 3 (d) 10,6	1
6	**Eccentricity of ellipse is** (a) 3/5 (b) 5/3 (c) 5/4 (d) 4/5	1
7	**Foci of ellipse :** (a) (±4,0) (b) (±5,0) (c) (±2,0) (d) (±3,0)	1
8	**Latus rectum of ellipse is** (a) 3 (b) 3.2 (c) 3.4 (d) 3.6	1
	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(A):** Centre of circle $x^2 + y^2 - 6x + 4y - 12 = 0$ is (3,-2) **Reason(R):** The radius of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ is $\sqrt{(g^2 + f^2 - c)}$ (a) (b) (c) (d)	1
10	Que 10: **Assertion(A):** Eccentricity of hyperbola $x^2 - y^2 = 6$ is $\sqrt{2}$ **Reason(R):** In hyperbola $x^2/a^2 - y^2/b^2 = 1$ if a = b than it becomes rectangular hyperbola (a) (b) (c) (d)	1

Answer Key

Ans1	**(c)**
Feedback	*Option c is correct, Since as per diagram axis of parabola is X-axis and equation of such parabola is $y^2 = 4ax$, focus of such is (a,0), and here a=5 , so equation become $y^2 = 20x$*
Ans2	**(a)**
Feedback	*Option c is correct, Since as per diagram axis of parabola is X-axis and equation of such parabola is $y^2 = 4ax$, focus of such is (a,0), and here a=5 , so focus is (5,0)*
Ans3	**(d)**

Feedback	*Option (d) is correct, Since, In equation of parabola $y^2 = 4ax$, Latus rectum is 4a, so here 4a = 4x5 =20*
Ans4	**(a)**
Feedback	*Option (a) is correct, Since here as per diagram put value of x = 45 in equation $y^2 = 20x$ therefore $y^2 = 20$ x 45 =900 and y = ±30, so coordinate of A (30,0) and coordinate of B (-30,0) so AB = 60 cm*
Ans5	**(d)**
Feedback	*Option (d) is correct, Since in equation of ellipse $x^2/a^2 + y^2/b^2 = 1$ Major Axis = 2a and Minor Axis = 2b, here a = 5 and b = 3, so length of Major axis = 10 and Minor axis = 6*
Ans6	**(d)**
Feedback	*Option (d) is correct, Since $a^2e^2 = a^2 - b^2$ here a= 5 and b=3, $25e^2 = 25 - 9 = 16$ $e^2 = 16/25$, e= 4/5*
Ans7	**(a)**
Feedback	*Option (a) is correct, foci of ellipse is (±ae,0) here foci is (*±5*4/5 , 0) therefore foci is (*±4,0)*
Ans8	**(d)**
Feedback	*Option (d) is correct, Since latus rectum = $2b^2/a$ so LR = 2*9/5=18/5 = 3.6*
Ans9	**(b)**
Feedback	*Option (b) is Correct, Since assertion and reason both are correct but reason is not correct explanation of assertion*
Ans10	**(a)**
Feedback	*Option (a) is Correct, Since assertion and reason both are correct and reason is correct explanation of assertion because in rectangular hyperbola a = b and their eccentricity = √2*