STRAIGHT LINES

101. The equation of the base of an equilateral triangle is $x + y = 2$ and the vertex is $(2, -1)$, then the length of the side of the triangle is

a) $\sqrt{3/2}\,/\sqrt{2/3}$ b) $\sqrt{2}$ c) $\sqrt{2/3}$ d) $\sqrt{3/2}$

102. The line $\frac{x}{a} - \frac{y}{b} = 1$ cuts the x-axis at P. The equation of the line through P perpendicular to the given line is

a) $x + y = ab$ b) $x + y = a + b$ c) $ax + by = a^2$ d) $bx + ay = b^2$

103. In the above question the coordinates of the other two vertices are

a) $(2, 0), (4,4)$ b) $(2,4), (4,0)$ c) $(-2, 0), (4, -4)$ d) $(2,0), (-4,4)$

104. The line $x + 2y = 4$ is translated parallel to itself by 3 units in the sense of increasing x and then rotated by 30° in the clockwise direction about the point where the shifted line cuts the x-axis. The equation of the line in the new position is

a) $y = \tan(\theta - 30°)(x - 4 - 3\sqrt{5})$

b) $y = \tan(30° - \theta)(x - 4 - 3\sqrt{5})$

c) $y = \tan(\theta + 30°)(x + 4 + 3\sqrt{5})$

d) $y = \tan(\theta - 30°)(x + 4 + 3\sqrt{5})$

105. If $\lambda x^2 - 10\,xy + 12\,y^2 + 5\,x - 16\,y - 3 = 0$, represents a pair of straight lines, then the value of λ is

a) 4 b) 3 c) 2 d) 1

106. The number of integral values of m, for which the x-coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer, is

a) 2 b) 0 c) 4 d) 1

107. The distance of the point (3, 5) from the line $2x + 3y - 14 = 0$ measured parallel to line $x - 2y = 1$, is

a) $\frac{7}{\sqrt{5}}$ b) $\frac{7}{\sqrt{13}}$ c) $\sqrt{5}$ d) $\sqrt{13}$

108. The equation $8x^2 + 8xy + 2y^2 + 26x + 13y + 15 = 0$ represents a pair of straight lines. The distance between then is

a) $\frac{7}{\sqrt{5}}$ b) $\frac{7}{2\sqrt{5}}$ c) $\frac{\sqrt{7}}{5}$ d) None of these

109. A system of lines is given as $y = m_i x + c_i$ where m_i can take any value out of $0, 1, -1$ and when m_i is positive, then c_i can be 1 or -1, when m_i equal 0, c_i can be 0 or 1 and when m_i equals to -1, c_i can take 0 or 2. Then, the area enclosed by all these straight line is

a) $\frac{3}{\sqrt{2}}(\sqrt{2} - 1)$sq unit b) $\frac{3}{\sqrt{2}}$sq unit c) $\frac{3}{2}$sq unit d) None of these

110. The angle between the lines represented by $x^2 - y^2 = 0$ is

a) 0° b) 45° c) 90° d) 180°

111. If the slope of one of the lines given by $36x^2 + 2hxy + 72y^2 = 0$ is four times the other, then $h^2 =$

a) 5040 b) 4050 c) 8100 d) None of these

112. If non-zero numbers a, b, c are in HP, then the straight line $\frac{x}{a} + \frac{y}{b} + \frac{1}{c} = 0$ always passes through a fixed point.That point is

a) $\left(1, -\frac{1}{2}\right)$ b) $(1, -2)$ c) $(-1, -2)$ d) $(-1, 2)$

113. The distance between the pair of lines given by $x^2 + y^2 + 2xy - 8ax - 8ay - 9a^2 = 0$ is

a) $2\sqrt{5}a$ b) $10\sqrt{a}$ c) 10a d) $5\sqrt{2}a$

114. The image of the origin with reference to the line $4x + 3y - 25 = 0$ is

a) $(-8, 6)$ b) $(8, 6)$ c) $(-3, 4)$ d) $(8, -6)$

115. The equation of a straight line passing through the point of intersection of $x - y + 1 = 0$ and $3x + y - 5 = 0$ and perpendicular to one of them, is

a) $x + y + 3 = 0$ b) $x - y - 3 = 0$ c) $x - 3y - 5 = 0$ d) $x - 3y + 5 = 0$

116. If the lines $kx - 2y - 1 = 0$ and $6x - 4y - m = 2$ are identical (coincident) lines, then the values of k and

m are

a) $k = 3, m = 2$ b) $k = -3, m = 2$ c) $k = -3, m = -2$ d) $k = 3, m = -2$

117. If $(-2,6)$ is the image of the point $(4,2)$ with respect to the line $L = 0$, then $L =$

a) $3x - 2y + 5$ b) $3x - 2y + 10$ c) $2x + 3y - 5$ d) $6x - 4y - 7$

118. $ax + by - a^2 = 0$, where a, b are non-zero, is the equation to the straight line perpendicular to a line l and passing through the point where l crosses the x-axis. Then, equation to the line l is

a) $\frac{x}{b} - \frac{y}{a} = 1$ b) $\frac{x}{a} - \frac{y}{b} = 1$ c) $\frac{x}{b} + \frac{y}{a} = ab$ d) $\frac{x}{a} - \frac{y}{b} = ab$

119. $L$is variable line such that the algebraic sum of the distances of the points (1, 1), (2, 0) and (0,2) from the line is equal to zero. The line L will always pass through

a) (1, 1) b) (2, 1) c) (1,2) d) (2, 2)

120. If $(-4, 5)$ is one vertex and $7x - y + 8 = 0$ is one diagonal of a square, then the equation of the second diagonal is

a) $x + 3y = 21$ b) $2x - 3y = 7$ c) $x + 7y = 31$ d) $2x + 3y = 21$

121. If the equations, $12x^2 - 10xy + 2y^2 + 11x - 5y + k = 0$ represents two straight lines, then the value of k is

a) 1 b) 2 c) 0 d) 3

122. The locus of the mid-point of the portion intercepted between the axes by the line $x \cos\alpha + y \sin\alpha = p$, where p is a constant is

a) $x^2 + y^2 = 4p^2$ b) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{4}{p^2}$ c) $x^2 + y^2 = \frac{4}{p^2}$ d) $\frac{1}{x^2} + \frac{1}{y^2} = \frac{2}{p^2}$

123. The orthocentre of the triangle formed by (0,0), (8,0), (4,6) is

a) $(4, 8/3)$ b) $(3, 4)$ c) $(4, 3)$ d) $(-3, 4)$

124. The orthocentre of the triangle with vertices $\left(2, \frac{\sqrt{3}-1}{2}\right), \left(\frac{1}{2}, -\frac{1}{2}\right)$ and $\left(2, -\frac{1}{2}\right)$ is

a) $\left(\frac{3}{2}, \frac{\sqrt{3}-3}{6}\right)$ b) $\left(2, -\frac{1}{2}\right)$ c) $\left(\frac{5}{4}, \frac{(\sqrt{3}-2)}{4}\right)$ d) $\left(\frac{1}{2}, -\frac{1}{2}\right)$

125. The image of the point (3,8) in the line $x + 3y = 7$, is

a) (1,4) b) (4,1) c) $(-1, -4)$ d) $(-4, -1)$

126. Family of lines $x \sec^2\theta + y \tan^2\theta - 2 = 0$ for different real θ, is

a) Not concurrent b) Concurrent at (1,1) c) Concurrent at $(2, -2)$ d) Concurrent at $(-2, 2)$

127. The number of the straight lines which are equally inclined to both the exes, is

a) 4 b) 2 c) 3 d) 1

128. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is/are

a) $-\frac{1}{2}$ b) -2 c) ± 1 d) 2

129. An equilateral ΔABC in first quadrant is such that A lies on x-axis, B lies on y-axis and BC is parallel to x-axis, then equation of straight line through C parallel to AB is ('a' is length of the side)

a) $y - \sqrt{3}x = \frac{3a\sqrt{3}}{2}$ b) $\sqrt{3}y + x = \frac{3a\sqrt{3}}{2}$ c) $y + \sqrt{3}x = \frac{3a\sqrt{3}}{2}$ d) None of these

130. The value 'p' for which the equation $x^2 + pxy + y^2 - 5x - 7y + 6 = 0$ represents a pair of straight lines, is

a) 5/2 b) 5 c) 2 d) 2/5

131. The equation of the line with gradient $-3/2$ which is concurrent with the lines $4x + 3y - 7 = 0$ and $8x + 5y - 1 = 0$ is

a) $3x + 2y - 2 = 0$ b) $3x + 2y - 63 = 0$ c) $2y - 3x - 2 = 0$ d) None of these

132. Let ABC be an isosceles triangle with $AB = BC$. If base BC is parallel to x-axis and m_1 and m_2 are the slopes of medians drawn through the angular points B and C, then

a) $m_1 m_2 = -1$ b) $m_1 + m_2 = 0$ c) $m_1 m_2 = 2$ d) $m_1 + 2m_2 = 0$

133. y-intercept of line passes through (2, 2) and is perpendicular to the line $3x + y = 3$, is

a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) 1 d) $\frac{4}{3}$

134. The equation of the bisector of the obtuse angle between the lines $3x - 4y + 7 = 0$ and $-12x - 5y + 2 = 0$, is

a) $21x + 77y - 101 = 0$
b) $99x - 27y + 81 = 0$
c) $21x - 77y + 101 = 0$
d) None of these

135. The equation of the line equidistant from the lines $2x + 3y + 5 = 0$ and $4x + 6y = 11$ is

a) $2x + 3y - 1 = 0$
b) $4x + 6y - 1 = 0$
c) $8x + 12y - 1 = 0$
d) None of these

136. The range of values of θ in the interval $(0, \pi)$ such that the points $(3,5)$ and $(\sin\theta, \cos\theta)$ lie on the same side of the line $x + y - 1 = 0$, is

a) $(0, \pi/2)$
b) $0, \pi/4$
c) $(\pi/4, \pi/2)$
d) None of these

137. Let θ_1 and θ_2 are the inclinations of lines L_1 and L_2 with x-axis. If $L_1$and L_2 pass through $P(x_1, y_1)$, then equation of one of the angle bisector of these lines is

a) $\frac{x - x_1}{\cos\left(\frac{\theta_1 - \theta_2}{2}\right)} = \frac{y - y_1}{\sin\left(\frac{\theta_1 - \theta_2}{2}\right)}$
b) $\frac{x - x_1}{-\sin\left(\frac{\theta_1 - \theta_2}{2}\right)} = \frac{y - y_1}{\cos\left(\frac{\theta_1 - \theta_2}{2}\right)}$
c) $\frac{x - x_1}{\sin\left(\frac{\theta_1 + \theta_2}{2}\right)} = \frac{y - y_1}{\cos\left(\frac{\theta_1 + \theta_2}{2}\right)}$
d) $\frac{x - x_1}{-\sin\left(\frac{\theta_1 + \theta_2}{2}\right)} = \frac{y - y_1}{\sin\left(\frac{\theta_1 + \theta_2}{2}\right)}$

138. Two verities of a triangle are $(5, -1)$and $(-2, 3)$. If the orthocenter of the triangle is the origin, then coordinates of third vertex are

a) $(4, 7)$
b) $(-4, -7)$
c) $(-4, 7)$
d) None of these

139. The product of the perpendicular distances from the origin on the pair of straight lines $12x^2 + 25xy + 12y^2 + 10x + 11y + 2 = 0$ is

a) $\frac{1}{25}$
b) $\frac{2}{25}$
c) $\frac{3}{25}$
d) $\frac{4}{25}$

140. If $A(2, -1)$ and $B(6, 5)$ are two points, then the ratio in which the foot of the perpendicular from $(4, 1)$ to AB divided it, is

a) $8: 15$
b) $5: 8$
c) $-5: 8$
d) $-8: 5$

141. If A and B are two fixed points, then the locus of a point which moves in such a way that the angle APB is a right angle is

a) A circle
b) An ellipse
c) A parabola
d) None of these

142. If the lines joining the origin to the points of intersection of $x^2 + y^2 + 2gx + c = 0$ and $x^2 + y^2 + 2fy - c = 0$ are at right angles, then

a) $g^2 + f^2 = c$
b) $g^2 - f^2 = c$
c) $g^2 - f^2 = 2c$
d) $g^2 + f^2 = c^2$

143. If the lines $x + 3y - 9 = 0$, $4x + by - 2 = 0$ and $2x - y - 4 = 0$ are concurrent, then b equals

a) -5
b) 5
c) 1
d) 0

144. If the line $y = mx$ meets the lines $x + 2\,y - 1 = 0$ and $2\,x - y + 3 = 0$ at the same point, then m is equal to

a) 1
b) -1
c) 2
d) -2

145. If the equation $kx^2 - 2xy - y^2 - 2x + 2y = 0$ represents a pair of lines, then k is equal to

a) 2
b) -2
c) -5
d) 3

146. The equation of a straight line passing through $(1, 2)$ and having intercept of length 3 between the straight lines $3x + 4y = 24$ and $3x\ 4y = 12$ is

a) $7x + 24y - 55 = 0$
b) $24x + 7y - 38 = 0$
c) $24x + 7y - 10 = 0$
d) None of these

147. The equation $x^2 + k_1 y^2 + k_2 xy = 0$ represents a pair of perpendicular lines if

a) $k_1 = -1$
b) $k_1 = 2\,k_2$
c) $2\,k_1 = k_2$
d) None of these

148. A line AB makes zero intercepts on x-axis and y-axis and it is perpendicular to another line CD which is $3x + 4y + 6 = 0$. The equation of line AB is

a) $y = 4$
b) $4x - 3y + 8 = 0$
c) $4x - 3y = 0$
d) $4x - 3y + 6 = 0$

149. The distance between the lines given by $(x + 7y)^2 + 4\sqrt{2}(x + 7y) - 42 = 0$, is

a) $4/5$
b) $4\sqrt{2}$
c) 2
d) $10\sqrt{2}$

150. The distance of the line $2x - 3y = 4$ from the point $(1, 1)$ measured parallel to the line $x + y = 1$, is

a) $\sqrt{2}$
b) $5/\sqrt{2}$
c) $1/\sqrt{2}$
d) 6