39. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45°, respectively. If the bridge is at a height of 3 m from the banks, find the width of the river.

A. $3\sqrt{3}$ m

B. $2(\sqrt{3}-1)$ m

C. $3(\sqrt{3}+1)$ m

D. None of these

40. Find the equation of the ellipse whose axes are parallel to the coordinate axes having its centre at the point $(2, -3)$, one focus at $(3, -3)$ and one vertex at $(4, -3)$.

A. $\dfrac{(x-2)^2}{4} + \dfrac{(y+3)^2}{2} = 1$

B. $\dfrac{(x-2)^2}{4} + \dfrac{(y+3)^2}{3} = 1$

C. $\dfrac{(x+3)^2}{4} + \dfrac{(y-2)^2}{2} = 1$

D. $\dfrac{(x+3)^2}{4} + \dfrac{(y-2)^2}{3} = 1$

41. Find the equation of a straight line parallel to $2x + 3y + 11 = 0$ and which is such that the sum of its intercepts on the axes is 15.

A. $2x + 3y - 18 = 0$

B. $2x + 3y + 18 = 0$

C. $2x + 3y - 15 = 0$

D. None of these

42. If $p$ times the $p^{\text{th}}$ term of an A.P. is equal to $(2p + 1)$ times the $(2p + 1)^{\text{th}}$ term, then find its $(3p + 1)^{\text{th}}$ term.

A. 1

B. −1

C. 0

D. $p$

43. Solution of the given system of inequations is _____.
$$\frac{x}{2x+1} \geq \frac{1}{4}, \frac{6x}{4x-1} < \frac{1}{2}$$

A. $\left(-\infty, -\dfrac{1}{2}\right]$

B. $\left(-\dfrac{1}{8}, \dfrac{1}{4}\right)$

C. $\left(\dfrac{1}{2}, \infty\right)$

D. $\phi$

44. If $a = \log_5 3 + \log_7 5 + \log_9 7$, then

A. $a \in [3/2, \infty)$

B. $a \in \left[\dfrac{1}{2^{1/3}}, \infty\right)$

C. $a \in \left[\dfrac{3}{2^{1/3}}, \infty\right)$

D. None of these

45. The contrapositive of the statement $\sim p \Rightarrow (p \wedge \sim q)$ is

A. $p \Rightarrow (\sim p \vee q)$

B. $p \Rightarrow (p \wedge q)$

C. $p \Rightarrow (\sim p \vee \sim q)$

D. None of these

46. For a set of five true/false questions, no student has written all correct answers and no two students have given the same sequence of answers. What is the maximum number of students in the class, for this to be possible?

A. 9

B. 32

C. 31

D. 24

47. A circus tent is cylindrical upto a height of 3 m and conical above it. If the diameter of the base is 105 m and the slant height of the conical part is 53 m, find the total cost of the canvas used to make the tent when the cost per square metre of the canvas is ₹ 10.

A. ₹ 95430

B. ₹ 87340

C. ₹ 104700

D. ₹ 97350

48. The mean and variance of 7 observations are 8 and 16 respectively. If 5 of the observations are 2, 4, 10, 12 and 14, then find the remaining two observations.

A. 6, 8

B. 10, 4

C. 9, 5

D. 7, 7

49. $3 \tan^6 10° - 27 \tan^4 10° + 33 \tan^2 10° =$

A. 0

B. 1

C. 2

D. 3

50. If $a^2 - 2a \cos x + 1 = 674$ and $\tan(x/2) = 7$, then the integral value of $a$ is

A. 25

B. 49

C. 67

D. 74