# september 4 shift2

EE24BTECH11066 - YERRA AKHILESH

16) The angle of elevation of a cloud **C** from a point **P**, 200m above a still lake is 30°. If the angle of depression of the image of **C** in the lake from the point **P** is 60°, then $PC$ (in m)

a) $200\sqrt{3}$ b) $400\sqrt{3}$ c) 400 d) 100

17) Let $\bigcup_{i=1}^{50} X_i = \bigcup_{i=1}^{n} Y_i = T$, where each $X_i$ contains 10 elements and each $Y_i$ contains 5 elements. If each element of the set $T$ is an element of exactly 20 of the sets $X_i$'s and exactly 6 of the sets $Y_i$'s, then n is equal to :

a) 15 b) 30 c) 50 d) 45

18) Let $x = 4$ be a directrix to an ellipse whose centre is at the origin and its eccentricity is $\frac{1}{2}$. If $\mathbf{P}(1,\beta), \beta > 0$ is a point on this ellipse,then the equation of the normal to it at $\mathbf{P}$ is :

a) $8x - 2y = 5$ b) $4x - 2y = 1$ c) $7x - 4y = 1$ d) $4x - 3y = 2$

19) Let $a_1, a_2, \ldots, a_n$ be a given A.P. whose common difference is an integer and $S_n = a_1 + a_2 + \ldots + a_n$. If $a_1 = 1$, $a_n = 300$ and $15 \le n \le 50$, then the ordered pair $(S_{n-4}, a_{n-4})$ is equal to:

a) $(2480, 248)$ b) $(2480, 249)$ c) $(2490, 249)$ d) $(2490, 248)$

20) The circle passing through the intersection of the circles, $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 - 4y = 0$, having its centre on the line, $2x - 3y + 12 = 0$, also passes through the point:

a) $(-1, 3)$ b) $(1, -3)$ c) $(-3, 6)$ d) $(-3, 1)$

21) Let $\{x\}$ and $[x]$ denote the fractional part of $x$ and the greatest integer $\le x$ respectively of a real number $x$. If $\int_0^n \{x\}\,dx, \int_0^n [x]\,dx$ and $10\left(n^2 - n\right), (n \in N, n > 1)$ are three consecutive terms of a G.P., then $n$ is equal to _____

22) A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, is _____

23) If $\bar{a} = 2\hat{i}+\hat{j}+2\hat{k}$, then the value of $|\hat{i}\times(\bar{a}\times\hat{i})|^2+|\hat{j}\times(\bar{a}\times\hat{j})|^2+|\hat{k}\times(\bar{a}\times\hat{k})|^2$ is equal to _____

24) Let $PQ$ be a diameter of the circle $x^2 + y^2 = 9$. If $\alpha$ and $\beta$ are the lengths of the perpendiculars from **P** and **Q** on the straight line, $x + y = 2$ respectively, then the maximum value of $\alpha\beta$ is _____

25) If the variance of the following frequency distribution:

| **Class** | 10-20 | 20-30 | 30-40 |
|---|---|---|---|
| **Frequency** | 2 | x | 2 |

is 50, then x is equal to _____