

# 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  $30^\circ$ . If the angle of depression of the image of **C** in the lake from the point **P** is  $60^\circ$ , 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 **P** is :
- a)  $8x - 2y = 5$                       b)  $4x - 2y = 1$                       c)  $7x - 4y = 1$                       d)  $4x - 3y = 2$
- 19) Let  $a_1, a_2, \dots, a_n$  be a given A.P. whose common difference is an integer and  $S_n = a_1 + a_2 + \dots + a_n$ . If  $a_1 = 1$ ,  $a_n = 300$  and  $15 \leq n \leq 50$ , 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  $\leq x$  respectively of a real number  $x$ . If  $\int_0^n \{x\} dx, \int_0^n [x] dx$  and  $10(n^2 - n), (n \in \mathbb{N}, n > 1)$  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  $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ , then the value of  $\left| \hat{i} \times (\vec{a} \times \hat{i}) \right|^2 + \left| \hat{j} \times (\vec{a} \times \hat{j}) \right|^2 + \left| \hat{k} \times (\vec{a} \times \hat{k}) \right|^2$  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 \_\_\_\_\_