

# jee-main-maths-05-09-2020-shift-1<sup>1</sup>

EE24BTECH11030 - J.KEDARANANDA

- 1) If the four complex numbers  $z, \bar{z}, \bar{z} - 2\operatorname{Re}(\bar{z})$  and  $z - 2\operatorname{Re}(z)$  represent the vertices of a square of side 4 units in the Argand plane, then  $|z|$  is equal to:
- a) 2                      b) 4                      c)  $4\sqrt{2}$                       d)  $2\sqrt{2}$
- 2) If  $\int (e^{2x} + 2e^x - e^{-x} - 1)e^{(e^x + e^{-x})} dx = g(x)e^{(e^x + e^{-x})} + c$ , where  $c$  is a constant of integration, then  $g(0)$  is equal to :
- a) 2                      b)  $e$                       c) 1                      d)  $e^2$
- 3) The negation of the Boolean expression  $x \leftrightarrow \sim y$  is equivalent to :
- a)  $(x \wedge y) \wedge (\sim x \vee \sim y)$   
b)  $(x \wedge y) \vee (\sim x \wedge \sim y)$   
c)  $(x \wedge \sim y) \vee (\sim x \wedge y)$   
d)  $(\sim x \wedge y) \vee (\sim x \wedge \sim y)$
- 4) If  $\alpha$  is positive root of the equation,  $p(x) = x^2 - x - 2 = 0$ , then  $\lim_{x \rightarrow \alpha^+} \frac{\sqrt{1 - \cos(p(x))}}{x + \alpha - 4}$  is equal to:
- a)  $\frac{1}{2}$                       b)  $\frac{3}{\sqrt{2}}$                       c)  $\frac{3}{2}$                       d)  $\frac{1}{\sqrt{2}}$
- 5) If the co-ordinates of two points **A** and **B** are  $(\sqrt{7}, 0)$  and  $(-\sqrt{7}, 0)$  respectively and **P** is any point on the conic,  $9x^2 + 16y^2 = 144$ , then  $PA + PB$  is equal to :
- a) 6                      b) 16                      c) 9                      d) 8
- 6) The natural number  $m$ , for which the coefficient of  $x$  in the binomial expansion of  $\left(x^m + \frac{1}{x^2}\right)^{22}$  is 1540, is  $\dots$
- 7) Four fair dice are thrown independently 27 times. Then the expected number of times, at least two dice show up a three or a five, is  $\dots$
- 8) Let  $f(x) = x \cdot \left[\frac{x}{2}\right]$ , for  $-10 < x < 10$ , where  $[t]$  denotes the greatest integer function. Then the number of points of discontinuity of  $f$  is equal to  $\dots$

- 9) The number of words, with or without meaning, that can be formed by taking 4 letters at a time from the letters of the word 'SYLLABUS' such that two letters are distinct and two letters are alike, is
- 10) If the line,  $2x - y + 3 = 0$  is at a distance  $\frac{1}{\sqrt{5}}$  and  $\frac{2}{\sqrt{5}}$  from the lines  $4x - 2y + \alpha = 0$  and  $6x - 3y + \beta = 0$ , respectively, then the sum of all possible values of  $\alpha$  and  $\beta$  is