03/09/2020-Shift 2

EE24BTECH11021 - Eshan Ray

16) If $\int \sin^{-1}\left(\sqrt{\frac{x}{1+x}}\right) dx = A(x)\tan^{-1}\left(\sqrt{x}\right) + B(x) + C$, where C is a constant of integration, then the ordered pair $(A(x), B(x))$ can be:
   a) $\left(x+1, -\sqrt{x}\right)$
   b) $\left(x-1, -\sqrt{x}\right)$
   c) $\left(x+1, \sqrt{x}\right)$
   d) $\left(x-1, \sqrt{x}\right)$

17) If the sum of the series $20 + 19\frac{3}{5} + 19\frac{1}{5} + 18\frac{4}{5} + \ldots$ upto n^{th} term is 488 and the n^{th} term is negative, then:
   a) $n = 60$
   b) $n = 41$
   c) n^{th} term is -4
   d) n^{th} term is $-4\frac{2}{5}$

18) Let p, q, r be three statements such that the truth value of $(p \wedge q) \rightarrow (\sim p \vee r)$ is F. The truth values of p, q, r are respectively:
   a) F, T, F
   b) T, F, T
   c) T, T, F
   d) T, T, T

19) If the surface area of the cube is increasing at a rate of $3.6cm^2/sec$,retaining its shape; then the rate of change of volume $\left(incm^2/sec\right)$, when the length of the cube is $10cm$ is:
   a) 9
   b) 10
   c) 18
   d) 20

20) Let R_1 and R_2 be two relations defined as follows:
   $R_1 = \left\{(a,b) \in R^2 : a^2 + b^2 \in Q\right\}$ and
   $R_2 = \left\{(a,b) \in R^2 : a^2 + b^2 \notin Q\right\}$, where Q is set of all rational numbers. Then:
   a) R_1 is transitive but R_2 is not transitive
   b) R_1 and R_2 are both transitive
   c) R_2 is transitive but R_1 is not transitive
   d) Neither R_1 nor R_2 is transitive

21) If m arithmetic means$(A.Ms)$ and three geometric means $(G.Ms)$ are inserted between 3 and 243 such that the $4^{th}A.M.$ is equal to $2^{nd}G.M.$, then m is equal to...

22) Let a plane P contain two lines $\overrightarrow{r} = \hat{i} + \lambda\left(\hat{i} + \hat{j}\right), \lambda \in R$ and $\overrightarrow{r} = -\hat{j} + \mu\left(\hat{j} - \hat{k}\right), \mu \in R$. If $Q(\alpha, \beta, \gamma)$ is the foot of the perpendicular drawn from the point $M(1,0,1)$ to P,

then $3(\alpha, \beta, \gamma)$ equals...

23) Let S be set of all integer solutions (x, y, z), of the system of equations
$x - 2y + 5z = 0$
$-2x + 4y + z = 0$
$-7x + 14y + 9z = 0$
such that $15 \leq x^2 + y^2 + z^2 \leq 150$. Then the number of elements in the set S is equal to ...

24) The total number of 3−digit number numbers, whose sum of digits is 10, is...

25) If the tangent at the curve, $y = e^x$ at a point (c, e^c) and the normal to the parabola, $y^2 = 4x$ at the point $(1, 2)$ intersect at the same point on the $x - axis$, then the value of c is...