# Chapter-1 Trignometric Functions and Equations

EE24BTECH11008-ASLIN GARVASIS

14) The expression $\frac{tanA}{1-cotA} + \frac{cotA}{1-tanA}$ can be written as:

(JEE M 2013)

a) $sin(A)cos(A) + 1$
b) $sec(A)cosec(A) + 1$
c) $tan(A) + cot(A)$
d) $sec(A) + cosec(A)$

15) Let $f_k x = \frac{1}{k}\left(sin^k x + cos^k x\right)$ where $x \in R$ AND $k \geq 1$. Then $f_4(x) - f_6(x)$ equals

(JEE M 2014)

a) $\frac{1}{4}$
b) $\frac{1}{12}$
c) $\frac{1}{6}$
d) $\frac{1}{3}$

16) If $0 \geq x \geq 2\pi$, then the number of real values of x, which satisfy the equation $cosx + cos2x + cos3x + cos4x = 0$ is:

(JEE M 2016)

a) 7
b) 9
c) 3
d) 5

17) If $5tan^2 x - cos^2 x = 2cos2x + 9$ then value of $cos4x$ is:

(JEE M 2017)

a) $\frac{-7}{9}$
b) $\frac{-3}{5}$
c) $\frac{1}{3}$
d) $\frac{2}{9}$

18) If sum of all the solutions of the equation $8\cos(x) \cdot cos\left(\frac{\pi}{6} + x\right) \cdot cos\left(\frac{\pi}{6}\right) - \frac{1}{2} - 1$ in $[0, \pi]$ is $k\,\pi$ then k is equal to:

(JEE M 2018)

a) $\frac{13}{9}$
b) $\frac{8}{9}$
c) $\frac{20}{9}$
d) $\frac{2}{3}$

19) For any $\theta \in \left(\frac{\pi}{4}\right),\left(\frac{\pi}{2}\right)$ the expression $3\left(in\theta - cos\theta^4 + 6\right)\left(sin\theta + cos\theta^2 + 4sin^6\theta\right)$ equals:

(JEE M 2019-9 Jan M)

a) $13 - 4cos^2\theta + 6sin^2\theta cos^2\theta$

b) $13 - 4cos^6\theta$

c) $13 - 4cos^2\theta + 6cos^4\theta$

d) $13 - 4cos^2\theta + 2sin^2\theta cos^2\theta$

20) The value of $cos^2 10^0 - cos10^0 cos50^0 + cos^2 50^0$ is:

(JEE M 2019-9 April M)

a) $\frac{3}{4} + cos20^0$
b) $\frac{3}{4}$

c) $\frac{3}{2}\left(1 + cos20^0\right)$
d) $\frac{3}{2}$

21) Let S=$\theta \in [-2\pi, 2\pi] : 2cos^2\theta + 3sin\theta = 0$. Then the sum of the elements of S is:

(JEE M 2019-9 April M)

a) $\frac{13\pi}{6}$
b) $\frac{5\pi}{3}$
c) 2
d) 1

## CHAPTER 4
Permutations and Combinations

Section-A JEE Advanced/IIT JEE
A Fill in the Blanks

1) In a certain test, $a_i$ students gave wrong answers to atleast $i$ questions, where $i = 1, 2, ..., k$. No student gave more than $k$ wrong answers. The total number of wrong answers given is.......

(1982-2 Marks)

2) The side $AB, BC$ and $BC$ of a triangle $ABC$ have 3,4 and 5 interior points respectively on them. The number of triangles that can be constructed using these interior points as vertices is......

(1984-2 Marks)

3) Total number of ways in which six $'+'$and four $'-'$signs can be arranged in a line such that no two $'-'$signs occur together is......

(1988-2 Marks)

4) There are four balls of different colours and four boxes of colours, same as those of the balls. The number of ways in which the balls,one each in a box,could be placed such that a ball does not go to a box of its own colour is.......

B True/False

1) The product of any $r$ consecutive natural numbers is always divisible by $r!$.

(1985-1 Marks)

C MCQs with One Correct Answer

1) $^nC_{r-1} = 36, ^nC_r = 84$ and $^nC_{r-1} = 126$, then $r$ is:

(1979-1 Marks)

   a) 1
   b) 2
   c) 3
   d) None of these

2) Ten different letters of an alphabet are given. Words with five letters are formed from these given letters. Then the number of words which have at least one letter repeated are

(1982-2 Marks)

   a) 69760
   b) 30240
   c) 99748
   d) none of the above