JEE Chapter 3 A,B

ai24btech11028 - Ronit Ranjan

A. Fill in the blanks

1) The coefficient of x^{99} in the polynomial $(x-1)(x-2)...(x-100)$ is... $(1982-2Marks)$
2) If $2+i\sqrt{3}$ is a root of the equation $x^2+px+q=0$,where p and q are real, then $(p,q)=(\ldots,\ldots)$ $(1982-2Marks)$
3) If the product of the roots of the equation

$$x^2-3kx+2e^{2\ln k}-1=0 \tag{1}$$

then the roots are real for $k=\ldots$ $(1984-2Marks)$
4) If the quadratic equation $x^2+ax+b=0$ and $x^2+bx+c=0\,(a\neq b)$have a common root then value of $a+b$ is $\ldots$ $(1986-2Marks)$
5) The solution of equation $\log_7\log_5\left(\sqrt{x+5}+\sqrt{x}\right)=0$ is $\ldots$ $(1986-2Marks)$
6) If $x<0, y, 0, x+y+\frac{x}{y}=\frac{1}{2}$ and $(x+y)\left(\frac{x}{y}\right)=-\frac{1}{2}$, then $x=\ldots$ and $y=\ldots$ $(1990-2Marks)$
7) Let n and k be such positive numbers such that $n\geq\frac{(k)(k+1)}{2}$. The number of solutions $(x_1,x_2,....x_k)\,, x_1\geq 1, x_2\geq 2, ..., x_k\geq k$, all integers, satisfying $x_1+x_2+...x_k=n$, is $\ldots$ $(1996-2Marks)$
8) The sum of all the real roots of the equation $|x-2|^2+|x-2|-2=0$ is $(1997-2Marks)$

B. True / False

1) For every integer $n>1$, the inequality $(n!)^{\frac{1}{n}}<\frac{n+1}{2}$ holds. $(1981-2Marks)$
2) The equation $2x^2+3x+1=0$ has an irrational root. $(1983-1Mark)$
3) If $a<b<c<d$, then the roots of the equation $(x-a)(x-c)+2(x-b)(x-d)=0$ are real and distinct. $(1984-1Mark)$
4) If $n_1,n_2,....n_p$ are p positive integers, whose sum is an even number, then the number of odd integers among them is odd. $(1985-1Mark)$
5) If $P(x)=ax^2+bx+c$ and $Q(x)=-ax^2+dx+c$, where ac $\neq 0$, then P(x)Q(x)=0 has at least two real roots. $(1985-1Marks)$
6) If x and y are positive real numbers and m,n are any positive integers, then $\frac{x^n y^m}{\left(1+x^{2n}\right)\left(1+y^{2m}\right)}>\frac{1}{4}$ $(1989-1Mark)$