DPP-01

SOME EXTRA QUESTION

1. Simplify the expression $x^5 + 10x^4a + 40x^3a^2 + 80x^2a^3 + 80xa^4 + 32a^5$.

2. Find n, if the ratio of the fifth term form the beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2}+\frac{1}{\sqrt[4]{3}}\right)^n$ is $\sqrt{6}: 1$.

3. Find the term in $\left(\sqrt[3]{\frac{a}{\sqrt{b}}}+\sqrt{\frac{b}{\sqrt[3]{a}}}\right)^{21}$ which has the same power of a and b.

4. Prove that $\sqrt{10}\left[(\sqrt{10}+1)^{100}-(\sqrt{10}-1)^{100}\right]$ is an even integer.

5. If $9^7 + 7^9$ is divisible by 2^n, then find the greatest value of n, where $n \in N$.

6. Prove that $\sum_{r=1}^{k}(-3)^{r-1}\,{}^{3n}C_{2r-1} = 0$, where $k = 3n/2$ and n is an even integer.

7. Find the value of $\frac{1}{81^n}-\frac{10}{81^n}\,{}^{2n}C_1+\frac{10^2}{81^n}\,{}^{2n}C_2-\frac{10^3}{81^n}\,{}^{2n}C_3+\cdots+\frac{10^{2n}}{81^n}$

8. Find the number of nonzero terms in the expansion of $(1+3\sqrt{2}x)^9+(1-3\sqrt{2}x)^9$

9. Find

(i) the last digit,

(ii) the last two digits, and

(iii) the last three digits of 17^{256}

10. Find the remainder when $6^n - 5n$ is divided by 25 .

11. Using binomial theorem, show that $2^{3x} - 7n - 1$ is divisible by 49. Hence, show that $2^{3n+3} - 7n - 8$ is divisible by 49, $n \in N$.

12. If $(2+\sqrt{3})^n = I + f$, where I and n are positive integers and $0 < f < 1$, show that I is an odd integer and $(1-f)\times(I+f) = 1$.

13. Show that $9^{n+1} - 8n - 9$ is divisible by 64 , whenever n is apositive integer.

14. Show that $2^{4n+4} - 15n - 15$, where $n \in N$ is divisible by 225 .

15. find the remainder when 7^{103} is divided by 25 .

ANSWER KEY

1.	$(x + 2a)^5$	**2.**	$n = 10$	**3.**	9
5.	6	**7.**	1	**8.**	5
9.	**(i)** 1, **(ii)** 8,1**(iii)** 6,8,1	**10.**	1	**15.**	18