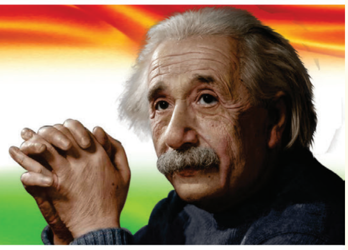
Bose Einstein Scholarship Test



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Sample Question for Class - 11

1. Let T_r be the r^{th} term of an A.P. whose first term is $-\frac{1}{2}$ and common difference is 1, then $\sum_{r=1}^{n}\sqrt{1+T_rT_{r+1}T_{r+2}T_{r+3}}$

   (a) $\frac{n(n+1)(2n+1)}{6}-\frac{5n}{4}$ (b) $\frac{n(n+1)(2n+1)}{6}-\frac{5n}{4}+\frac{1}{4}$

   (c) $\frac{n(n+1)(2n+1)}{6}-\frac{5n}{4}+\frac{1}{2}$ (d) $\frac{n(n+1)(2n+1)}{12}-\frac{5n}{8}+1$

2. The minimum value of $\frac{(A^2+A+1)(B^2+B+1)(C^2+C+1)(D^2+D+1)}{ABCD}$ When A,B,C,D > 0 is :

   (a) $\frac{1}{3^4}$ (b) $\frac{1}{2^4}$ (c) 2^4 (d) 3^4

3. The value of the sum $\sum_{k=1}^{\infty}\sum_{n=1}^{\infty}\frac{k}{2^{n+k}}$ is equal to:

   (a) 5 (b) 4 (c) 3 (d) 2

4. Number of zero's at the ends of $\prod_{n=5}^{30}(n)^{n+1}$ is

   (a) 111 (b) 147 (c) 137 (d) None of these

5. If $z=re^{i\theta}$ $(r>0 \;\&\; 0\le\theta<2\pi)$ is a root of the equation $z^8-z^7+z^6-z^5+z^4-z^3+z^2-z+1=0$ then number of values of 'θ' is:

   (a) 6 (b) 7 (c) 8 (d) 9

6. If z_1, z_2, z_3 are complex number, such that $|z_1|=2, |z_2|=3, |z_3|=4$, then maximum value of $|z_1-z_2|^2+|z_2-z_3|^2+|z_3-z_1|^2$ is :

   (a) 58 (b) 29 (c) 87 (d) None of these

7. If F_1 and F_2 are the feet of the perpendiculars from foci S_1 and S_2 of the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ on the tangent at any point P of the ellipse, then:

   (a) $S_1F_1+S_2F_2\ge 2$ (b) $S_1F_1+S_2F_2\ge 3$ (c) $S_1F_1+S_2F_2\ge 6$ (d) $S_1F_1+S_2F_2\ge 8$

8. If $u_n=\sin(n\theta)\sec^n\theta, v_n=\cos(n\theta)\sec^n\theta, n\in N, n\ne 1, then \frac{v_n-v_{n-1}}{u_{n-1}}+\frac{1u_n}{nv_n}=$

   (a) $-\cot\theta+\frac{1}{n}\tan(n\theta)$ (b) $\cot\theta+\frac{1}{n}\tan(n\theta)$

   (c) $\tan\theta+\frac{1}{n}\tan(n\theta)$ (d) $-\tan\theta+\frac{\tan(n\theta)}{n}$

9. If the tangent and normal at a point on rectangular hyperbola cut-off intercept a_1, a_2 on x-axis and b_1, b_2 on the y-axis, then $a_1a_2+b_1b_2$ is equal to :

   (a) 2 (b) $\frac{1}{2}$ (c) 0 (d) –1