SOLUTION PAGE

DIVISION: **ALPHA** TEST: **Sequences and Series**

1. ALL END IN 0.
$5 \cdot 6 = 30$
A

2. $\sin^2 n + \cos^2 n = 1 \ \forall n$
C

3. $r = 2^{\frac{1}{3}-\frac{1}{2}} = 2^{-\frac{1}{6}}$
C $\sqrt{2}, \sqrt[3]{2}, \sqrt[6]{2}, 1, \sqrt[-6]{2}$

4. $\frac{\frac{a}{b}}{1-\frac{a}{b}} = \frac{1}{3}$
A $\frac{a}{b-a} = \frac{1}{3}$
$3a = b-a$
$4a = b$

5. $\frac{1996(1+.3991)}{2} =$
B 3984016

6. $\frac{1996(1+1996)}{2} =$
E 1993006

7. $F_{12} = 144$
D $F_{13} = 233$
$F_{16} = 987$

8. 0, 0, e, 0, 0, e, ...
16 even
B 34 odd $\frac{34}{50} = \frac{17}{25}$

9. $a_{50} = 7 + 49(-1.5)$
D $= -66.5$

10. $\sqrt{699.1966} =$
C NOT A PERFECT SQUARE

11. $101 \cdot 5 = 505$
D

12. $900 = \frac{7(101 + a_7)}{2}$
C $1800 - 707 = 7a_7$
$156.14\ldots = a_7$

13. $4 + 7 + 10 + \ldots + 28$
$-(3 + 6 + 9 + \cdots + 27)$
C $1 + 1 + 1 \ldots + 1 \ +1$

14. $S = \frac{24}{1-\frac{1}{2}}$
A $= 48$

SOLUTION PAGE

DIVISION: **ALPHA** TEST: **Sequences and Series**

15. $1 + \underbrace{i + i^2 + i^3 + i^4}_{0} + \ldots + i^{1996}$ (0)

D 1

16. $|z| < 1$

C

17. $2\left(\frac{84}{1-\frac{3}{4}}\right) - 84$

$7 \cdot 84 = 588$

D

18. $\binom{10}{1} + \binom{10}{2} + \binom{10}{3} + \ldots + \binom{10}{10}$

$2^{10} - 1$

B

19.
1:35
1:47
1:59
2:10
2:22

C

20. $\frac{10^9}{9!} = 2755.+$

$\frac{10^{10}}{10!} = 2755.+$

$\frac{10^{11}}{11!} = 2505.+$

B

21. $a_n = 19 + 77(n-1)$

$2021 = 19 + 77(27-1)$

C

22. $\frac{1}{0!} - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} \ldots \frac{1}{8!} =$

0.3678

C

23. $-1 + 3 + 7 + 11$

B.

24. 4, 8, 12

$a_{100} = 4 + 99 \cdot 4$

$= 400$

A

25. $\frac{4^2(1^2 + 2^2 + 3^2 + \ldots + 499^2)}{1^2 + 2^2 + 3^2 + \ldots + 499^2}$

$= 4^2$

B

26. $\log_2 1 + \log_2 2 + \ldots + \log_2 n =$

$\log_2 (1 \cdot 2 \cdot 3 \cdot \ldots \cdot n) =$

$\log_2 n!$

B.

27. Squares $\frac{n(n+1)(2n+1)}{6}$

A $\frac{1996 \cdot 1997 \cdot 3993}{6} =$

2,652,690,986

28.

B

AM GM

$\frac{a+b}{2} \overset{?}{>} \sqrt{ab}$

$(a+b)^2 > 4ab$

$a^2 - 2ab + b^2 > 0$ TRUE

HM GM

$\frac{2ab}{a+b} \overset{?}{>} \sqrt{ab}$

$2\sqrt{ab} \overset{?}{>} a+b$

$2ab > (a+b)^2$ FALSE

AM HM

$\frac{a+b}{2} \overset{?}{>} \frac{2ab}{a+b}$

$(a+b)^2 > 4ab$

TRUE

29.

B

$1+1+1$

$2+2+2+2+2$

$3+3+3+3+3+3+3$

$4+4+4+$

$3+10+21+16=50$

30

A

$a-d, a, a+d$

$A = -(3a)$

$B = a^2 - ad + a^2 + ad + a^2 - d^2$

$= 3a^2 - d^2$

$C = -(a(a^2 - d^2))$

$= -a^3 + ad^2$