BAREM a V -a

SUBIECTUL I

1.

Pentru n = 2k+1,avem $17^{2k+1}=17^{2k}\cdot 17=17^{2k}\cdot(2^2+2^2+3^2)=2^2\cdot 17^{2k}+2^2\cdot 17^{2k}+3^2\cdot 17^{2k}$ ………………...1p

Finalizare…………………………………………………………………………………...1p

Pentru n= 2k+2, avem $17^{2k+2} = 17^{2k}\ 17^{2} = 17^{2k}\ (12^2+12^2+1^2)=$
$(17^k\cdot 12)^2+(17^k\cdot 12)^2+(17^k)^2$ 1p

2.

Avem $832_{10}=1101000000_2$ ………………………………………… ……………… 1p

$1101000000_2 = 2^9+2^8+2^6$ …………………………………………………… 1p

$(3x+3,\ 2y+2,\ z+1) \in \{(9, 8, 6), (9,6,8), (8,6,9), (8,9,6), (6,8,9), (6,9,8)$………… 1p

Solutiile admise sunt $(x,y,z)\in\{(2,3,5),(2,2,7),(1,3,8)\}$…………………………………..1p

SUBIECTUL II

Solutie.

Daca $a=x,\ b=x+1,\ x\in\{0,1,2,3,4,5,6,7,8\}$…………………………………………….2p

Avem: $\overline{ab5}=5^{a+b} \Leftrightarrow 100a+10b+5=5^{a+b}$ ……………………………………...1p

$\Leftrightarrow$ 100x+10(x+1) + 5 = $5^{2x+1} \Leftrightarrow 110x = 5^{2x}\cdot 5-15 \Leftrightarrow 110x=5(5^{2x}-3)$…………….2p

$\Leftrightarrow 22x=5^{2x}-3$,…………………………………………………………………………1p

ecuatie care din multimea $\{0,1,2,3,4,5,6,7,8\}$, are unica solutie x=1, ………………… 1p

de unde rezulta ca a=1 si b=2

SUBIECTUL III

a)

$a_1=2$

$a_2=2^2$

... $\Rightarrow a_1<a_2<\ldots<a_{10}$ $(1p)$

$a_{10}=2^{10}$ $(\mathbf{2}p)$

b) Fie S= $a_1+a_2+a_3+\ldots+a_{10}$ **(1p)**

$S=2+2^2+2^3+\ldots+2^{10}$ **1p**

$2S-S=(2^2+2^3+2^4+\ldots+2^{11})$

$-(2+2^2+2^3+\ldots+2^{10})=2^{11}-2=2(2^{10}-1)$ **(2p)**

SUBIECT IV

A={ 0 ; 4 }...……… 1p

B={ 0;1;4;5;6;9}...1p

$A\cup B$=B.. ……….....................1p

Cum z^2+z = z (z+1) = 2p, p $\in$ N

$2011^{z^2+z}=(2011^p)^2$ este pătrat perfect...1p

C = N 1p

afirmația (a) este adevărată..1p

Deoarece 0 $\in A\cap B$

(b) este adevărată...1p