Title: Hexadecimal and Octal Number Systems

(1)

(A) $25_{10} = 31_8$

(B) $49_{10} = 61_8$

(C) $187_{10} = 273_8$

(D) $398_{10} = 616_8$

(E) $2879_{10} = 54778$

(A) $25 \div 8 = 3$ r 1; $3 \div 8 = 0$ r 3

(B) $49 \div 8 = 6$ r 1; $6 \div 8 = 0$ r 6

(C) $187 \div 8 = 23$ r 3; $23 \div 8 = 2$ r 7; $2 \div 8 = 0$ r 2

(D) $398 \div 8 = 49$ r 6; $49 \div 8 = 6$ r 1; $6 \div 8 = 0$ r 6

(E) $2879 \div 8 = 359$ r 7; $359 \div 8 = 44$ r 7; $44 \div 8 = 5$ r 4; $5 \div 8 = 0$ r 5

(2)

(A) $36_8 = 30_{10}$

(B) $75_8 = 61_{10}$

$3\ 6 \times 8\ 1$

$24 + 6 = 30$

$7\ 5 \times 8\ 1$

$56 + 5 = 61$

(C) $143_8 = 99_{10}$

(D) $367_8 = 247_{10}$

$1\ 4\ 3 \times 64\ 8\ 1$

$64 + 32 + 3 = 99$

$3\ 6\ 7 \times 64\ 8\ 1$

$192 + 48 + 7 = 247$

(E) $1735_8 = 989_{10}$

$1\ 7\ 3\ 5 \times 512\ 64\ 8\ 1$

$512 + 448 + 24 + 5 = 989$

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(3)

(A) $25_{10} = 19_{16}$

$16\overline{)25}$ r = (9) $16\overset{0}{\overline{)1}}$ r = (1)

(B) $46_{10} = 2E_{16}$

$16\overset{2}{\overline{)46}}$ (r = 14) $16\overset{0}{\overline{)2}}$ (r = 2)

-32

14

(C) $120_{10} = 78_{16}$

$16\overset{7}{\overline{)120}}$ r = (8) $16\overset{0}{\overline{)7}}$ r = (7)

-112

8

(D) $429_{10} = 1AD_{16}$

$16\overset{26}{\overline{)429}}$ $16\overset{1}{\overline{)26}}$ $16\overset{0}{\overline{)1}}$ r = (1)

-416 -16

(13) (10)

D A

(E) $1215_{10} = 4BF$

$16\overset{75}{\overline{)1215}}$ $16\overset{4}{\overline{)75}}$ $16\overset{0}{\overline{)4}}$ r = (4)

-112 -64

95 (11)

-80 B

(15)

F

(4)

(A) $3B_{16} = 59_{10}$

$3 \quad 11$

$\times \; 16 \quad 1$

$48 + 11 = 59$

(B) $A9_{16} = 169_{10}$

$10 \quad 9$

$\times \; 16 \quad 1$

$160 + 9 = 169$

(C) $159_{16} = 345_{10}$

$1 \quad 5 \quad 9$

$\times \; 256 \quad 16 \quad 1$

$256 + 80 + 9 = 345$

(D) $2A3_{16} = 675_{10}$

$2 \quad 10 \quad 3$

$\times \; 256 \quad 16 \quad 1$

$512 + 160 + 3 = 675$

(E) $1AB3_{16} = 6835_{10}$

$1 \quad 10 \quad 11 \quad 3$

$\times \; 4096 \quad 256 \quad 16 \quad 1$

$4096 + 2560 + 176 + 3 = 6835$

Binary	Octal	Hexadecimal	Decimal
101011_2	53	2B	43
110100011	643	1A3	419
1010110_2	326	D6	214
101111	137	5F	95
1010111110_2	536	15E	350

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Conclusion

(1) C, since Base 8 is smaller than Base 10, an equivalent in Base 8 would have to be smaller than it's counterpart in Base 10, ruling out B. A is additionally not a valid octal number.

(2) The shopper does not understand Hexadecimal.

1/28/25

Cameron Owens

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Witness:	Date:	
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