(1) rank = 3
(2) (a) $a = 3$; (b) 18
(3)
(4) (i) and (ii)
(5) C
(6) C
(7) D
(8) E
(9) B
(10) None of the given answers, but $(-1+i, 2)$.

Solution for # 10:

$$A - (-2+i)I = \begin{bmatrix} -3+2-i & -1 \\ 2 & -1+2-i \end{bmatrix} = \begin{bmatrix} -1-i & -1 \\ 2 & 1-i \end{bmatrix}.$$

Multiply the first row by $-1+i$ to obtain

$$\begin{bmatrix} 2 & 1-i \\ 2 & 1-i \end{bmatrix},$$

which reduces to

$$\begin{bmatrix} 2 & 1-i \\ 0 & 0 \end{bmatrix}.$$

Therefore, a solution $\mathbf{v} = (v_1, v_2)$ to $(A - (-2+i)I)\,\mathbf{v} = \mathbf{0}$ satisfies $2v_1 + (1-i)v_2 = 0$. The vector $(-1+i, 2)$ is such a solution.