| Universiti | Faculty of Chemical \& Natural Resources Engineering <br> Malaysia <br> PAHANG |
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| Universiti Malaysia Pahang <br> BKC2463 SCIENCE \& ENGINEERING MATERIAL <br>  |  |

1. Draw crystallographic direction for:
(i) $[110]$
(ii) [123]
2. Determine the Miller indices for following plane:


Figure 1
3. What is the notation for vector direction in the cubic crystal in Figure 2?


Figure 2
(a) [321]
(b) [231]
(c) $[\overline{2} 3 \overline{1}]$
(d) $[32 \overline{1}]$
4. What is the notation for vector direction in the cubic crystal in Figure 3?


Figure 3
(a) [301]
(b) $(2 \overline{1} 3)$
(c) $[213]$
(d) $(30 \overline{1})$
5. Draw direction vector in unit cubic for the following cubic direction:
(i) $[221]$
(ii) $[112]$
6. Determine Miller indices of the planes shown in the following unit cell:


Figure 4
7. Draw the vector direction and Miller index plane of:
(i) [313]
(ii) [121]
(iii) (421)
(iv) (111)

