⑤

$(15)(26)(37)(48), (1753)(2864), (14)(23)(58)(67),$
$(12)(38)(14)(56), (18)(27)(36)(45), (16)(25)(34)(78)\}$

b) $P_G(x_1,x_2,x_3,x_4) = \frac{1}{|G|}\sum_{g\in G} cs(g)$

$= \frac{1}{8}(cs(e)+cs(r)+cs(r^2)+cs(r^3)+cs(s)+cs(rs)$

$+cs(r^2s)+cs(r^3s))$

$= \frac{1}{8}(x_1^8+x_4^2+x_2^4+x_4^2+x_2^4+x_2^4+x_2^4+x_2^4)$ ✓

$P_G(x_1,x_2,x_3,x_4) = \frac{1}{8}(x_1^8+2x_4^2+5x_2^4)$ ✓ 3/3

c) The no. of equivalence classes is given by replacing each x_i in the above expression by the no. of colours available i.e. the no. of equivalence classes is $\frac{1}{8}(m^8+2m^2+5m^4)$. ✓ 2/2

d) $P_G(x_1,x_2,x_3,x_4) = \frac{1}{8}(x_1^8+2x_4^2+5x_2^4)$

$x_1^8 = (R+W+B)^8$
$x_4^2 = (R^4+W^4+B^4)^2$
$x_2^4 = (R^2+W^2+B^2)^4$

∴ the pattern inventory is given by
$\frac{1}{8}((R+W+B)^8+2(R^4+W^4+B^4)^2+5(R^2+W^2+B^2)^4)$ ① ✓ 3/3

e) no. of equivalence classes specified, N
$= \frac{1}{8}(N(R^4W^2B^2)+N(R^2W^4B^2)+N(R^2W^2B^4))$ ①

1/1

where $N(R^bW^cB^d)$ is the no. of equivalence classes with b Red, c white and d blue flags resp. In eq. ① only the first and 3rd terms contribute to N.

∴ $N(R^4W^2B^2) = \frac{8!}{4!2!2!} + \frac{5\times4!}{2!1!1!} = 420+60=480$ ✓

✓ 2/2 ✓ 2/2