The moles for octane will be multiplied by 9 because 1 mole of octane produces 9 moles of water vapor.

Convert to grams

$mass = n \times M$

$mass = (6.166 \times 9) \times 18$

$mass = 999\ g$

$mass = 0.999\ kg$

$\therefore There\ is\ 0.999\ kg\ of\ H_2O\ released\ per\ litre\ of\ petrol$

$\therefore The\ total\ amount\ of\ gas\ releasd\ per\ litre\ of\ petrol =$
$2.17 + 0.999$
$= 3.169\ kg$

Change in enthalpy:

$\Delta H = energy\ required\ to\ break\ bonds - energy\ released\ when\ new\ bonds\ form$
$= H(reactants) - H(products)$

Reactants

1 mole of C_8H_{18} and 12½ moles of O_2 contain:

4 moles of C-C bonds = 4 x 347 = 1388 kJ/mol
18 moles of C-H bonds = 18 x 413 = 7434 kJ/mol
12½ moles of O=O bonds = 12.5 x 495 = 6187.5 kJ/mol

Energy required to break bonds = 1388 + 7434 + 6187.5
= 15009.5 kJ/mol

Products

8 moles of CO_2 and 9 moles of H_2O

16 moles of C=O bonds = 16 x 745 = 11920 kJ/mol
18 moles of H-O bonds = 18 x 464 = 8352 kJ/mol

Energy released when new bonds form = 11920 + 8352
= 20272 kJ/mol

$\Delta H = energy\ required\ to\ break\ bonds - energy\ released\ when\ new\ bonds\ form$
$\Delta H = 15009.5 - 20272$
$\Delta H = -5262.5 \frac{kJ}{mol} (exothermic)$

Combustion of ethanol

$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$

Moles of ethanol used