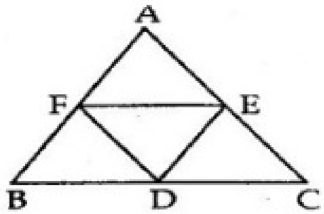
Question 7:

Given : A ΔABC in which D, E and F are the mid points of BC, AC and AB respectively.
DE, EF and FD are joined to get four triangles.



To Prove : Four triangle AFE, BFD, FDE and EDC are Congruent.
Proof : Since F, E are mid point of AB and AC

So, $EF = \frac{1}{2} BC$ [By Mid point Theorem]

Similarly $FD = \frac{1}{2} AC$

and $ED = \frac{1}{2} AB$

Now, in ΔAFE and ΔBFD, we have

$$AF = FB$$

$$FE = \frac{1}{2} BC = BD$$

$$FD = \frac{1}{2} AC = AE$$

Thus by Side-Side-Side criterion of congruence, we have

$\therefore$ $\Delta AFE \cong \Delta BFD$ [By SSS]

Again, in ΔBFD and ΔFED, we have

$FE \parallel BC$

i.e. $FE \parallel BD$ and $AB \parallel ED$

i.e. $FB \parallel ED$, by Mid point Theorem.

So, BDEF is a parallelogram.

$\therefore$ FD being a diagonal divides the parallelogram into two congruent triangles

$\therefore$ $\Delta BFD \cong \Delta FDE$

Similarly we can prove FECD is a parallelogram.

So, $\Delta FED \cong \Delta EDC$

Thus, all the four triangles
$\Delta BFD, \Delta FDE, \Delta FED$ and ΔEDC
are congruent to each other.

*********** END **********