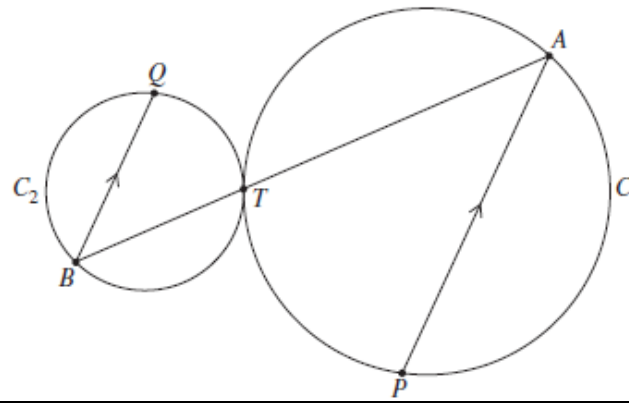| 13 | 13 d | The circles C_1 and C_2 touch at the point T. The points A and P are on C_1. The line AT intersects C_2 at B. The point Q on C_2 is chosen so that BQ is parallel to PA.

Copy or trace the diagram into your writing booklet.

Prove that the points Q, T and P are collinear. | | 3 |

(i)

Draw common tangent XY to T.

$$\angle XTQ = \angle QBT \ (\angle\text{s in alt segm in } C_1)$$

$$\angle QBT = \angle PAT \ (\text{alt}\angle\text{s equal, } QB || AP)$$

$$\angle PAT = \angle YTP \ (\angle\text{s in alt segm in } C_2)$$

$$\therefore \ \angle XTQ = \angle YTP$$

$$\therefore Q, T \text{ and } P \text{ collinear (vert opp } \angle\text{s)}$$

State Mean:
0.94/3

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

Only a small number of candidates used the fact that the 'circles touched', resulting in the use of a common tangent at T or the line of centres passing through the point of contact.

Common problems were:
- using the fact that QTP was a straight line in their proof, when this is what was required
- not giving supporting reasons for each step in the proof
- not annotating the diagram that they had to copy into their answer booklet.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/