Topic 22 Circle theorems (Post-TT) [33] MARKSCHEME

1.

(a) 65 — B1

$\frac{1}{2}$ angle at centre — B1

(b) 115 — B1 ft

ft 180 – their 65 provided reason given is not contradictory

Opposite angles (of cyclic quad) — B1

or other valid explanation
eg $x + y = 180$

[4]

2.

(a) 180 – 190 – 62 or 90 – 62 — M1

oe

28 — A1

(b) (i) 40 — B1

(ii) 140
or 180 – their x — B1 ft

Do not ft if answer = 140 in (b)(i)

[4]

3.

(a)		58° Subtended on same arc **oe**	**2** 1 AO2.1a 1 AO2.4b	**B1** for angle
(b)		68° e.g. angle DBC is 32° because the angle in a semicircle is a right angle **oe** so angle ACB is 68° because angles in a triangle sum to 180° **oe**	**3** 2 AO2.1a 1 AO2.4b	**B1** for using the angle in a semicircle is a right angle **B1** for using angles in a triangle sum to 180°

4.

(a) angle QPR = 32° — B1

Base angle of isosceles triangle

angle QSR = 32° — B1

equal to angle QPR, angles in same segment oe
precise explanations for 2 marks

(b) (i) 116° — B1

(ii) Line from O to A, creating 90°

Join OA *using alt seg thm*

angle OAB = 16° — M1

angle CA(X) = 48° *M1*
angle BCA = 74° *M1*

angle OAC = 42° — M1

angle OAC = 42° *M1*
angle BCO = 32° *M1*

angle OCA = 42° — A1

angle OCA = 42° *A1*
angle OCA = 42° *A1*

[6]

5.

angle OSQ = angle $OQS = 50°$ B1

Isosceles triangle OQS *Penalise 'no reason'*

angle $OSR = 90° \rightarrow$ angle $QSR = 40°$ B1

Tangent-radius property *first time only*

angle QSR = angle QRS (Isosceles) B1

[3]

6.

29°	C1	angle $OTP = 90°$, quoted or shown on the diagram
	M1	method that leads to 180 – (90 + 32) or 58 shown at TOP OR that leads to 122 shown at SOT
	M1	complete method leading to "58"÷2 or (180 – "122") ÷ 2 or 29 shown at TSP
	C1	for angle of 29° clearly indicated and appropriate reasons linked to method eg angle between radius and tangent = 90° and sum of angles in a triangle = 180°; ext angle of a triangle equal to sum of int opp angles and base angles of an isos triangle are equal or angle at centre = 2x angle at circumference or ext angle of a triangle equal to sum of int opp angles

7.

angle $ABC = x$	M1
angle $BAC = x$ and alternate segment theorem	M1
angle $ABC = x$ and angle $BAC = x$ and alternate segment theorem and two equal angles so isosceles ($AC = BC$)	A1

8.

Proof	C1	for joining AO (extended to D) and considering angles in two triangles (algebraic notation may be used here)
	C1	for using isosceles triangle properties to find angle BOD (eg. $x + x = 2x$) or angle COD (eg. $y + y = 2y$)
	C1	for angle $BOC = 2x + 2y$ [= 2×angle BAO + 2×angle CAO]
	C1	for completion of proof with all reasons given, eg. base angles of isosceles triangle are equal and sum of angles at a point is 360°