M.M.: 20   **Time: 30 min**
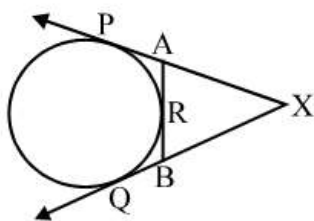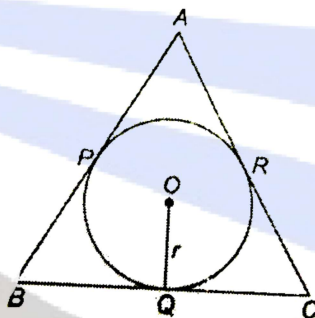
General Instructions:

(i) There are 10 questions in this paper. Each question carry 2 marks.
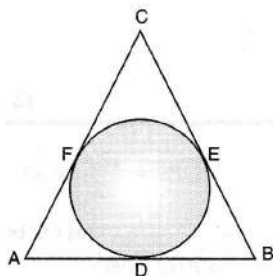
(ii) All questions are compulsory.

1.   Figure, XP and XQ are tangents from X to the circle with centre O, R is a point on the circle. Prove that, $XA + AR = XB + BB$.
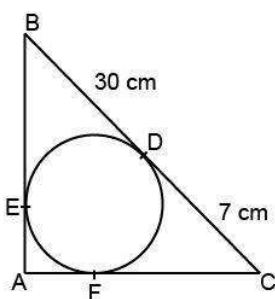

2.   From an external point P, two tangents PA and PB are drawn to a circle with centre O. At one point E on the circle tangent is drawn which intersects PA and PB at C and D respectively. If $PA = 10\,cm$, find the perimeter of $\triangle PCD$.

3.   In Figure, the sides AB, BC and CA of triangle ABC touch a circle with centre 0 and radius r at P, Q and R respectively.

4.   Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

5.   PQ is a chord of length $8\,cm$ of a circle of radius $5\,cm$. The tangents at P and Q intersect at a point T. Find the length TP.

6.   A circle is inscribed in a $\triangle ABC$ having sides $8\,cm, 10\,cm$ and $12\,cm$ as shown in Figure. Find AD, BE and CF.

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7. If from an external point B of a circle with centre O, two tangents B C and B D are drawn such that $\angle DBC = 120°$, prove that $BO = 2BC$.

8. In Fig. BDC is a tangent to the given circle at point D such that BD = 30 cm and CD = 7 cm The other tangents B E and C F are drawn respectively from B and C to the circle and meet when produced at A making BAC a right angle triangle. Calculate (i) A F (ii) radius of the circle.

9. From a point P two tangents P A and P B are drawn to a circle with centre at O. If $OP = 2r$, show that ΔPAB is equilateral.

10. A triangle PQR is drawn to circumscribe a circle of radius $8 cm$ such that the segments QT and TR, into which QR is divided by the point of contact T, are of lengths $14 cm$ and $16 cm$ respectively. If area of ΔPQR is $336 cm^2$, find the sides PQ and PR.