KWAZULU NATAL EDUCATION DEPARTMENT

STANMORE SECONDARY SCHOOL

GRADE 11

MATHEMATICS

FIRST CONTROL

TEST 2021

MARKS: 75

TIME: 90 MINUTES

EXAMINER : K.H.MOODLEY MODERATOR : I. MANILALL

Question 1

1.1 Solve for x in each of the following:

1.1.1 $2x(x+1)=6$ (3)

1.1.2 $x^2-5x\leq -6$ (3)

1.1.3 $5^x+5^{x-1}=30$ (3)

1.1.4 $\sqrt{2-x}=x+4$ (3)

1.2 Solve for x and y simultaneously if:
$2x=y+2$ and $2x^2=2-y^2$ (6)

1.3 Prove that the equation $6x^2+2px-3x-p=0$ has rational roots for all rational values of p. (4)

[22]

Question 2

2.1 Simplify:

2.1.1 $\frac{3.3^x-4.3^{x+2}}{3^x-3^{x-1}}$ (4)

2.1.2 $\sqrt[3]{343x^{12}}+\sqrt[3]{64x^{12}}$ (3)

2.1.2 $\sqrt{3}\left(\sqrt{3}+\sqrt{6}\right)+\sqrt{2}$ (Answer in simplest surd form) (3)

[10]

Question 3

3.1 If $\cos 23^\circ = p$, express, **without the use of a calculator**, the following in terms of p:

3.1.1 $\cos 203^\circ$ (3)

3.1.2 $\sin 293^\circ$ (3)

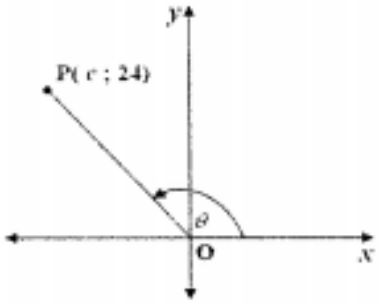
3.2 Simplify the following expression to a single trigonometric term

$$\frac{\sin(360° - x).\tan(-x)}{\cos(180° + x).(\sin^2 A + \cos^2 A)}$$ (6)

3.3 In the diagram alongside P is the point (c ; 24).

θ is the angle of inclination of OP.

OP = 25 units



3.3.1 Calculate the numerical value of c. (2)

3.3.2 Determine, **without using a calculator**, the value of:

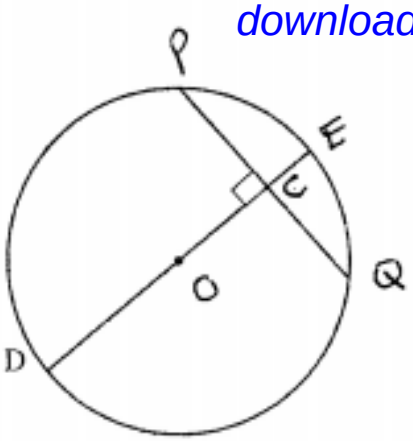
(a) $\sin\theta$ (2)

(b) $\tan(180° + \theta)$ (2)

[18]

Question 4

4.1 In the diagram, O is the centre of the circle. The diameter DE is perpendicular to the chord PQ at C. DE = 20 cm and CE = 2 cm.



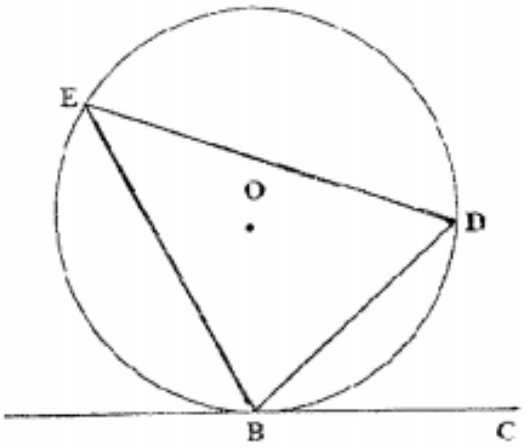
Calculate the length of the following with reasons:

4.1.1 OC (3)

4.1.2 PQ (4)

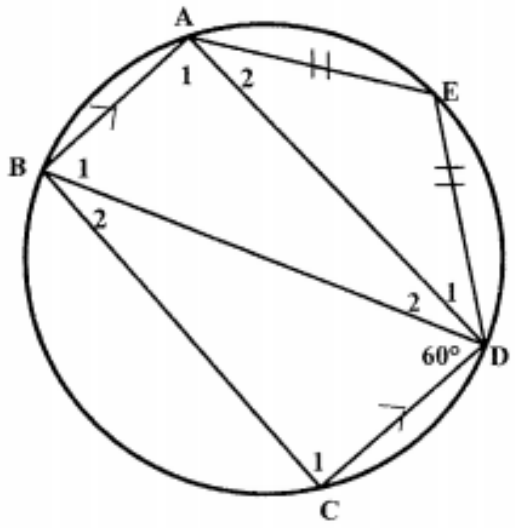
4.2 In the diagram below, O is the centre of circle EBD.

If BC is a tangent to the circle, then: $\mathbf{D\hat{B}C = \hat{E}}$



(6)

4.3 In the diagram below BD is a diameter of the circle. BA ∥ CD. AE= ED and $B\hat{D}C = 60°$.Calculate, stating reasons, the size of the following angles:



3.3.1 $\hat{C}_1$ (3)

3.3.2 $\hat{B}_1$ (3)

3.3.3 $\hat{E}$ (3)

3.3.4 $\hat{D}_1$ (3)