S.S.L.C. EXAMINATION, MARCH - 2015
MATHEMATICS (English)

Time : 2½ Hours Total Score : 80

Instructions :

1) **Read questions carefully, understand each question and then answer.**

2) **Give explanations wherever necessary.**

3) **If there is an OR between any two questions, you may answer only one among them.**

4) **15 minutes will be given at the beginning as cool off time. This time may be utilised to read and understand the questions.**

5) **Simplification using irrationals like $\sqrt{2}, \pi$ etc. with their approximate values is not required if not specified in the question.**

[SCORE]

Q1) First term of an arithmetic sequence is 10 and its common difference 3. Write the first three terms of the sequence. Verify whether 100 is a term of this sequence. [2]

Q2) Which number added to the polynomial $3x^2 - 4x - 1$ gives a polynomial with $(x - 1)$ as a factor. [2]

Q3) If the equation $x^2 + kx + k = 0$ has only one solution, find the possible values of k. [2]

Q4) Draw x and y axes and mark the points A(–1, 2), B(6, 3). [2]

[SCORE]

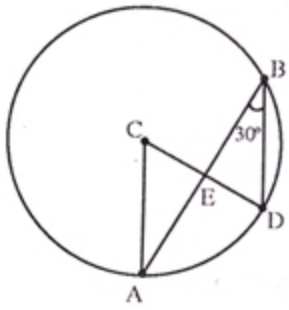
Q5) The scores obtained by 50 students in an examination is tabulated as shown below. [3]

Score	Number of students
below 10	3
below 20	7
below 30	13
below 40	22
below 50	32
below 60	40
below 70	46
below 80	50

Find the median score.

Q6) Sum of first n terms of an arithmetic sequence is $3n^2 + n$. Find the first term and common difference of this sequence. [3]

Q7)

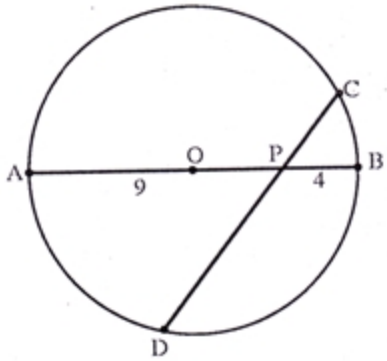


In the figure, C is the centre of the circle and $\angle ABD = 30°$ [3]

a) What is the measure of $\angle ACD$?

b) If $\angle ABD = \angle CAB$ and AB = 6 cm, find the radius of the circle.

OR



In the figure O is the centre of the circle. CD is a chord which is not perpendicular to the diameter AB. PA = 9 cm and PB = 4 cm.

a) What is PC × PD?

b) Show that the length of PC and PD cannot be natural numbers at a time.

Q8)

There is a mark on the outermost part of a wheel of radius 30 centimetres. Now the mark is close to the ground as shown in the figure. If the wheel rolls 31.4 centimetres on a straight line, then [3]

a) Find the angle by which the wheel rotates (use $\pi = 3.14$ as an approximation).

b) What will be the height of the mark from the ground?

[SCORE]

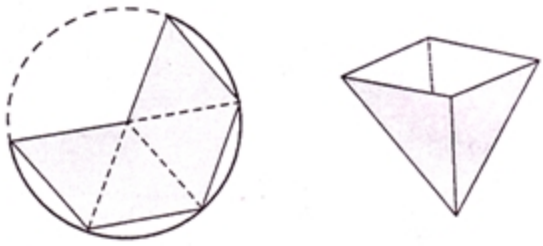
Q9) A box contains 8 black beads and 12 white beads. Another box contains 9 black beads and 6 white beads. One bead from each box is taken. [4]

a) What is the probability that both beads are black?

b) What is the probability of getting one black bead and one white bead?

Q10) Write the polynomial $3x^2 - 5x - 2$ as a product of two first degree polynomials. [4]

Q11)



From a tin sheet, a sector of radius 20 centimetres and central angle 240° is divided in to four equal parts as shown in the figure. Then the shaded portion is cut off. Using this, a vessel in the shape of a square pyramid is made. What is the capacity of this vessel? [4]

Q12) The table below shows the classification of students participated in a camp, according to their height. [4]

Height (cm)	Number of students
130-135	8
135-140	12
140-145	20
145-150	28
150-155	32
155-160	22
160-165	16
165-170	12

Calculate the mean height of the students.

[SCORE]

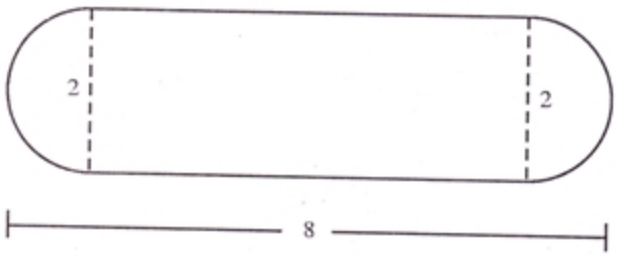
Q13) a) What is the volume of a solid metal cylinder of height 4 centimetres and radius 5 centimetres?

b) This solid is melted and recast in to 5 cones of equal height and radius 2 centimetres. Find the height of such a cone.

[4]

OR

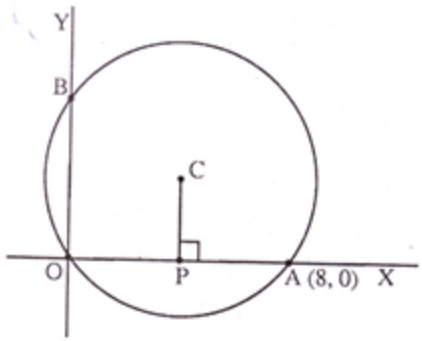
A tank is in the shape of a cylinder with two hemispheres attached to both ends as shown in the figure.



Its common diameter is 2 metres and total length is 8 metres. Find be the total cost of painting the outer surface of this tank at the rate of 60 rupees per square metre.

(use $\pi = 3.14$ as an approximation)

Q14)



In the figure the radius of the circle centred at C is 5. The circle passes through the point A(8,0). If PC is perpendicular to x axis, find the coordinates of the points P, B and C.

[4]

P.T.O.

[SCORE]

~~Q15)~~ The terms of an arithmetic sequence with common difference 4 are natural numbers. [4]

a) If x is a term in this sequence, what is the next term?

b) If the sum of reciprocals of two consecutive terms of this sequence is $\frac{4}{15}$, find those terms.

OR

a) Lengths of sides of a right angled triangle are in arithmetic sequence with common difference d. If the length of the smallest side of the triangle is x-d, write the length of its other two sides.

b) Show that any right angled triangle with sides in arithmetic sequence is similar to the right angled triangle with sides 3, 4 and 5.

~~Q16)~~ Draw a triangle of sides 5 cm, 6 cm and 7 cm. Draw its incircle. Measure and write the radius of the incircle. [4]

Q17) A line of slope 2 passes through the point A(1,3). [4]

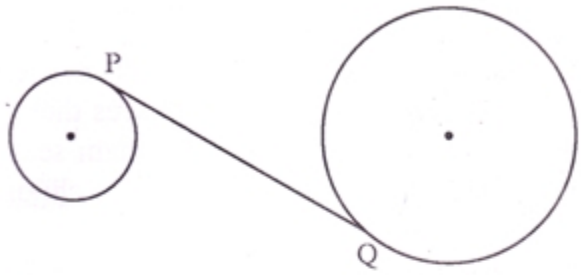
a) Check whether B(3,7) is a point on this line.

b) Write down the equation of this line.

c) Find the coordinates of a point C on the line such that BC = 2AB.

[SCORE]

Q18)



In the figure, the radius of the smaller circle is 3 centimetres, that of the bigger circle is 6 centimetres and the distance between the centres of the circles is 15 centimetres. PQ is a tangent to both the circles. Find its length. [4]

~~*Q19)*~~ Consider the arithmetic sequence 9, 15, 21 ..... [5]

a) Write the algebraic form of this sequence.

b) Find the twenty fifth term of this sequence.

c) Find the sum of terms from twenty fifth to fiftieth of this sequence.

d) Can the sum of some terms of this sequence be 2015? Why?

~~*Q20)*~~ In triangle ABC, AB = 5 cm. $\angle A = 80^\circ$ and $\angle B = 70^\circ$. Calculate the radius of the circumcircle and length of the other two sides. [5]
(Necessary values can be taken from the following table)

Angle	sin	cos	tan
70°	0.94	0.34	2.75
80°	0.98	0.17	5.67

P.T.O.

[SCORE]

OR

Gopi and Gautham stand on opposite sides of a tower. The children and the tower are on a straight line also. Gopi sees the top of the tower at an angle of elevation of 36° and Gautham sees it at an angle of elevation of 52°. The distance between the children is 60 metres.

a) Draw a rough figure according to the given information.

b) Find the height of the tower. (Height of children can be neglected. Necessary values can be taken from the following table).

Angle	sin	cos	tan
36°	0.59	0.81	0.72
52°	0.79	0.62	1.28

Q21) Equation of a line is $y = 2x$. [5]

a) A is a point on the line. If the x coordinate of A is -2, find its y coordinate.

b) Verify whether a circle of radius 5 centred at A passes through the point B(5, 5).

c) Radius of a circle passing through B is 5 and its centre is on the above mentioned line. Find the coordinates of its centre.

Q22) Draw a triangle with sides 5 cm, 6 cm and 6 cm. Draw a square having the same area of the triangle. [5]

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