



Royal College - Colombo 07

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Grade 11 –First Term Evaluation – March 2020

Time : 2 hours
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Mathematics – I

ගණිතය - I

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Name /Index No : -

Certified Correct.

.....
Signature of Invigilator

Important:

- ❖ This paper consists of 8 pages.
- ❖ Write your **Index Number** correctly in the appropriate places on this page and on page three.
- ❖ Answer all questions on this paper itself.
- ❖ Use the space provided under each question for working and writing the answer.
- ❖ It is necessary to indicate the relevant steps and the correct units in answering the questions.
- ❖ Marks will be awarded as follows.
Two marks each for questions 1 - 25 in part **A**.
Ten marks each for questions in part **B**.
- ❖ A blank paper can be obtained for rough work from the supervisor on your request.

For Marking Examiner's use only

Question Numbers		Marks
A	1 - 25	
B	1	
	2	
	3	
	4	
	5	
Total		

PART A

Answer **all** questions on the **paper itself**.

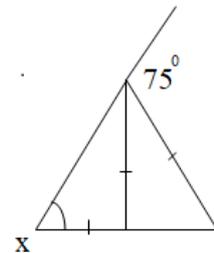
(01) If $\lg 3 = 0.4771$ then find the value of $\lg \frac{1}{3}$

(02) Simplify and express using positive indices $\sqrt[3]{a^{-3}}$.

(03) Write the coordinates of the turning point of the graph $y = 2 - x^2$

(04) If a fair die numbered from 1 to 6 are tossed twice, what is the probability of obtaining a prime number in both instances.

(05) Find the value of x in the given figure.



(06) Make r as the subject of the formula $\frac{p+r}{p-r} = \frac{S}{Q}$



(07) Simplify

$$3\sqrt{63} - 2\sqrt{28} + 3\sqrt{7}$$

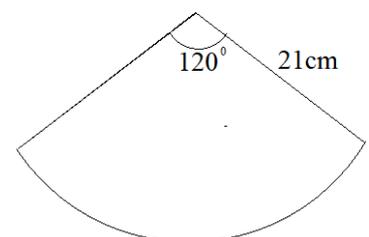
(08) If an item is sold for Rs. 5750 with a profit of 15%, calculate its purchase price.

(09) Expand $(3x + 1)^3$

(10) The surface area of a solid sphere is 280 cm^2 . Find the surface area of one hemisphere if the sphere is broken into two halves.

(11) The perimeter of a rhombus is 52 cm. If the length of one diagonal is 10 cm then find the length of other other diagonal.

(12) The given sector of a circle is bent into a cone shape. Find the radius of the base of the cone.



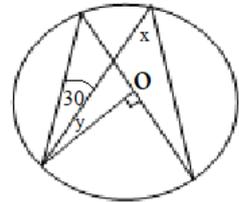
- (13) Tick the “✓” sign in front of each correct expression in the table and the “x” symbol against each wrong expression.

$3^{-2} \times 2^2 < 1$	
$lg12 > 1$	
$(0.7)^2 > 0.11^2$	

- (14) Factor $\frac{x^2}{3} - \frac{1}{27}$

- (15) Find the L.C.M of $2x$, $3y^2$, $12x^3y$

- (16) Find the values of x and y using the given data in the circle with center o .



- (17) If $\epsilon = \{1, 2, 3, 4, 5, 6, 7\}$ and $A = \{2, 4, 6\}$ find $P(A')$

- (18) Write the 3rd and 4th term of the number sequence with the common term $1 + (-1)^n$.

- (19) Write the equation of the straight line which passes through the point (0,3) and parallel to the x axis.

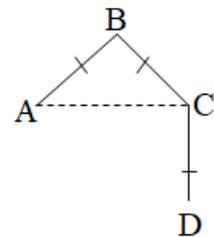
- (20) Find the value of c in the arithmetic progression 2, a , b , 11, c .

(21) Write the corresponding positive integral values of the inequality $2x + 1 < 5$.

(22) If the pipe fills a tank of capacity **18l** in 40 seconds, find the rate at which water flowed out through the pipe in liters per minute.

(23) AB, BC, CD are the sides of the regular polygon. If $\hat{BAC} = 30^\circ$

(i) Find the value of an exterior angle of the regular polygon.

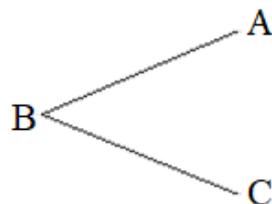


(ii) Find the number of sides of the regular polygon.

(24) If $4x + 6y = 52$

$51x + 49y = 58$, find the value of $x + y$ without solving the equations.

(25) Using the knowledge of locus, draw a rough sketch to find the point **P** which is equidistant to the straight lines AB, BC and $BP = CP$.

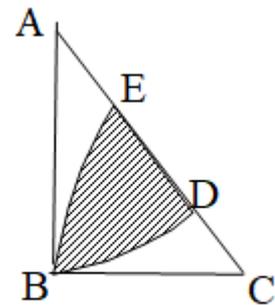


PART B

Answer all questions on this paper itself.

- (01) From a completely filled tank, $\frac{2}{3}$ of the water was used on the 1st day. On the 2nd day $\frac{1}{3}$ of the remaining of the stock of water was used. on the 3rd day, the half portion of the remaining water of **750 l** was used.
- (i) Give the remaining water after use on the 1st day as a fraction of the total volume.
 - (ii) What fraction of the entire tank was used for day 2 ?
 - (iii) What is the fraction of the entire tank was remaining for the 4th day?
 - (iv) Give the capacity of the whole tank in liters.
 - (v) How many hours does it take to empty the full tank if a pipe that discharges **50 l** per minute?

- (02) In the given figure, ABC is a right angled triangle. Where $AB = BC = 14$ cm. BE is an arc drawn with A as the center and AB as the radius. Similarly, BD is an arc drawn with C as the center and CB as the radius.

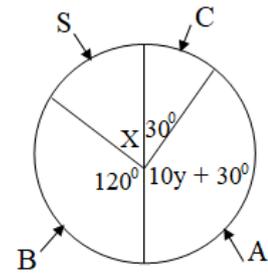


- (i) Find the values of \widehat{BAC} and \widehat{BCA}
- (ii) What is the area of the triangle ABC?
- (iii) What is the area of the sector ABE?
- (iv) Find the area of the shaded portion.
- (v) Find the perimeter of the shaded portion area? (Assume $\sqrt{2} = 1.44$)



(02) In a certain school the results obtained for the subject of mathematics in G. C. E. (O/L) are given below.

Pass Type	number of students
A	80
B	a
C	b
D	32



Using the above data

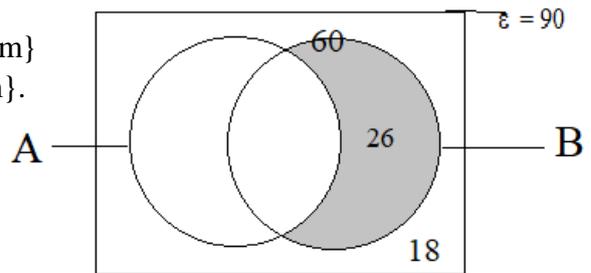
- (i) Find the value of the angle x on the pie chart.
- (ii) Find the total number of students who sat for the exam.
- (iii) Build up an equation of y and find the value of it.
- (iv) Find the values of a and b in the table.
- (v) If students obtained **C** pass or higher are only qualified for the G.C.E. (A / L), find the percentage of the student those who have selected for the A/L.

(04) If a man shares his money with himself and his wife in the ratio of 3:4. The wife gives her portion to the children Amal, Bimal and Kamal in the ratio of $\frac{1}{3} : \frac{1}{4} : \frac{1}{5}$.

- (i) Express the ratio in the simplest form the wife shared from her portion to her children. .
- (ii) Which child got the least amount of money?
- (iii) If the child who has got the least portion is Rs. 48 000, find the amount of the money who got highest portion.
- (iv) Find the amount of money wife received.
- (v) What is the total amount shared by the man ?

05) a) The details of the students who sat for the examination are shown in the following Venn diagram

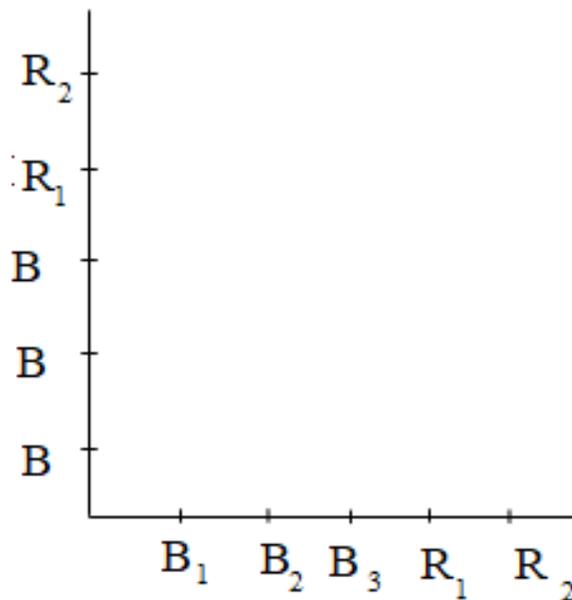
- $\epsilon = \{\text{Students who sat for the exam}\}$
- $A = \{\text{female students who sat for the exam}\}$
- $B = \{\text{Students who did not pass the exam}\}$.



Write the answers using the Venn diagram.

- (i) How many female students have passed the examination?
 - (ii) Describe the students represented in the shaded area.
 - (iii) Write the shaded area in the Venn diagram in set notation.
- (b) A box contains 3 blue handkerchiefs and 2 red handkerchiefs. A handkerchief is taken from the box at random and put back to the box after its colour recorded, and then another handkerchief is taken out of the box.

(i) Show the sample space in the given grid. (B-Blue, R-Red)



- (ii) Find the probability that both handkerchiefs are of the same colour.
- (iii) Find the probability that the first handkerchief is blue and the second handkerchief is red.





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Grade 11 – First Term Evaluation – March 2020

පළමු වාර ඇගයීම - 2020 මාර්තු - 11 ශ්‍රේණිය

Time: 3 hours

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Mathematics - II

32

E

II

ගණිතය - II

Important

- Answer 10 questions selecting **five** questions from part **A** and **five** questions from part **B**.
- Write the relevant steps and the correct units in answering the questions.
- Each question carries 10 marks.
- The volume of a right circular cylinder with radius of the base r is $\pi r^2 h$

Part - A

Answer **five** questions **only**.

- (01) The custom duty 75% of value of the item is charged when a luxury item worth Rs. 40,000 is imported.
- What is the value of the item after the custom duty is paid?
 - If the price of the item after adding the VAT(Value Added Tax) is Rs. 78 400, find the percentage of the VAT.
 - What is the selling price to earn a profit of 25% after giving a discount of 5% from the marked price of the item during the time of sale?
 - Find the marked price of that item.
 - Find the percentage profit if it is sold at the marked price?

- (02) An incomplete table to sketch the graph of the function $y = 3 - 2x^2$ is given below.

X	-3	-2	-1	0	1	2	3
Y	-15	-5	---	3	1	-5	-15

- Find the value of y when $x = -1$.
 - Using the table, sketch the graph for the above function by selecting a suitable scale.
- Using the graph,
 - Write the range of values of x for which the function is positive?
 - Write the co-ordinate of the turning point of the graph?
 - Find the roots of the function $3 - 2x^2 = 0$
 - Find the root of the function $2x^2 - 5 = 0$ by drawing an appropriate straight line.

(03) The cross-section of a solid metal prism is a right angled triangle. The lengths of the two sides which make a right angle are 6 cm and 9 cm. The length of the prism is 49 cm. Without wasting the metal the prism is melting and a solid cylinder of the same volume is made. The ratio between the base radius(r) and the height(h) of the cylinder is 2: 3. Show that its radius $r = 7 \times \sqrt[3]{\frac{9}{11}}$ and find the value of radius correct to the second decimal place using the table of logarithms.

(04) (a) Find the value of 101^3 by using the expansion of $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$

(c) Find the value of $\sqrt{8.5 \times 7.5 + 0.5^2}$ by using the knowledge of the factors.

(c) The ratio between the two numbers is 4: 3. When 2 is added to the larger number and 6 is subtracted from the smaller number then the new ratio is 7: 4 . Find these two numbers. (Take large number as x and small number as y .)

(05) (a) Seven more than three times of a number is 91. Find that **number**

(b) Area of a rectangle is less than the area of a square by 14 cm^2 . The length and breadth of the rectangle can be obtained by adding 2cm and reducing 3cm of the length of the square respectively. Find the length of the square.

(06) The following frequency distribution provides information the number of tourists arrival during the last 50 days in the year 2013 to a tourist hotel.

Number of Tourists	51-60	61-70	71-80	81-90	91-100	101-110	111-120
Number of Days	2	4	8	10	12	8	6

(i) Find the modal class.

(ii) Find the median class.

(iii) By taking the mid value of the modal class as assumed mean, find the mean number of tourists have arrived for a day in the year 2013 to the nearest whole number.

(iv) If the mean of 50 days of the year in 2012 is 80, show that this amount has been increased by 12.5% in the year 2013.

Part - B

(Answer five questions only.)

07. First three terms of an arithmetic progression is given below

37, 31, 25, ...

- (i) Obtain a formula for the n^{th} term of the progression.
- (ii) Find the 12th term of the progression.
- (iii) By building up an inequality find which term starts to represent negative numbers.
- (iv) Find the sum of the first 13 terms.
- (v) If the sum of the first 14 terms is -28, find the 14th term using the values of (iv) and (v) parts.

08. In the following constructions, use a straight edge with cm/mm scale and a pair of compasses only.

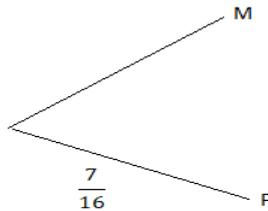
Show your construction lines clearly.

- (i) Construct the triangle ABC such that $BC = 6.4 \text{ cm}$, $AB = 3 \text{ cm}$ and $\widehat{ABC} = 90^\circ$.
- (ii) Construct the locus of the points moving equidistance B and C.
- (iii) Mark the intersection point of the locus and the side AC as O.
- (iv) Construct a circle with O as the center and OA as the radius.
- (v) Name and measure the diameter of the circle.
- (vi) State the theorem to make it as a diameter

09. (a) In a random experiment, if $p(A) = \frac{2}{5}$ Find the value of $p(A')$.

(b) The probability of a female selected from a group in which there are Males(M) and Females(F) is $\frac{7}{16}$.

(i) Complete the below tree diagram that shows the selection of Male(M) and Female(F)



(ii) The probability being a right-hand male is $\frac{2}{3}$ and left-hand female is $\frac{2}{7}$. Extend the tree diagram to represent this and find the probability of a right-handed female person.

10. (a) Amal observes that the angle of elevation of the highest point of the mountain from the East direction of him is 30° and that the angle of elevation of the same point of the mountain from a point which is 100 m closer to the mountain than the East direction(Previous point) is 60° . (Use the scale 1: 2000 and ignore Amal's height)

- (i) Draw a scale diagram to represent the above information.
- (ii) Using a scale diagram find the length of the straight-line which represent the height of the mountain.
- (iii) Find the actual height of the mountain from the ground.

(b) In a scientific experiment, the distance traveled by the object in each second was measured.

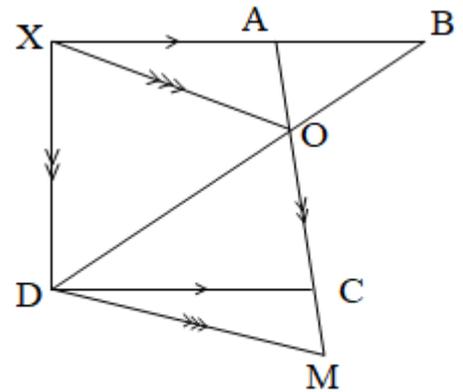
They are given in the following table.

Time(s)	0	1	2	3	4	5	6
Distance(m)	0	10	20	30	40	50	60

- (i) Plot the points such that the time is on the horizontal axis and the distance is on the vertical axis and join them.
- (ii) Find the gradient of the graph. What is denoted by the gradient?
- (iii) Find the distance travelled in 8 seconds by extending the graph.
- (iv) Find the time taken to travel 35 m?
- (v) Build up an equation in terms of S, t and V. The speed and distance traveled in t seconds are V and S respectively.

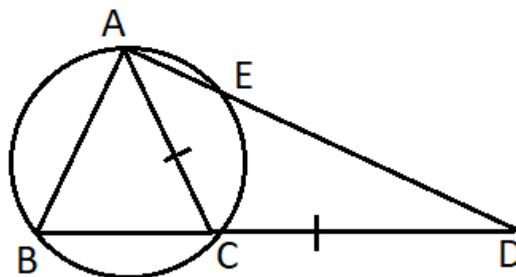
11. In the figure XAB and AOCM are the straight lines. $XB \parallel DC$, $XD \parallel AM$ and $XO \parallel DM$.

- (i) Name a parallelogram which is equal in area to the area of the parallelogram XACD
- (ii) What is the relationship between the area of $\triangle DBC$ and the area of parallelogram XACD?
- (iii) What is the relationship between the area of $\triangle DOM$ and the area of parallelogram XOMD?
- (iv) Prove that $\triangle DCM = \triangle BOC$



12. (a) AB and AC are two equal chords. BC produced to D such that CA=CD. AD intersect the circle at E.

Prove that BE is a bisector of the angle \widehat{ABC} .



(b) O is the center of the circle. Find the value of n using the given data.

