S. Thomas' College – Mount Lavinia
Term II Examination – 2018
Mathematics II

Grade 10   **Time :Threehours**

Answer 10 questions selecting 5 questions from part A. 5 questions from part B.

PartA

1. a) The value of a video camera which is being imported is Rs. 20 000, A 25% of custom duty charged for it. A business man marks its price expecting Rs. 10 000 of profit. If VAT of 15% is added to the total value of the item. How much does a customer have to pay for the video camera.

    b) It takes 5 men 12 days to dig a foundation. But they were able to finish $\frac{4}{7}$ of the total task.
        a) Find the magnitude of the task in mandays.
        b) How many days will it take five men to complete the remaining tasks.

2. a) The table show percentages of income taxes, which was implemented by the Inland Revenue Department.

Annual Income	Tax percentage
Initial Rs. 500 000	Tax free
Next Rs. 500 000	4%
Next Rs. 500 000	8%
Next Rs. 500 000	12%

    Mr. Nimal's annual income is Rs. 1 800 000
    i.   Find his the taxable income.
    ii.   How much income tax does he have to pay for a year.
    iii. If he paid an annual income tax of Rs. 16 000 in a certain year. Find his annual income.

    b) If a total amount of Rs. 37 200 had to be paid after 2 years to settle the loan taken at an annual simple interest rate of 12%. Find the loan amount.

3. The following table of values to draw the graph of the function. $y = 3 - 2x^2$.

x	-3	-2	-1	0	1	2	3
y	-15	-5	....	3	1	-5	-15

    i.   Find the value of y when $x = -1$.
    ii.   Taking 10 small divisions along the y axis to represent two units and 10 small divisions along the x axis to represent one unit as scale and draw the graph of the function.
    iii. Using your graph
        a) Find the coordinates of maximum point
        b) Write the range of x where the function $y \geq 1$.
        c) The range of function is increasing positively
        d) Write the positive root of the equation $3 - 2x^2 = 0$.

4.	i.	Solve $\dfrac{3}{2x+1} = \dfrac{1}{x-1}$
	ii.	Number of Rs. 2 coins in a box is three times of number of Rs. 5 coins in the box. Total value of the coins in the box is Rs. 88.
		a) Construct two simultaneous equations by taking number of Rs. 2 coins as "x" and number of Rs. 5 coins as "y".
		b) Find the number of Rs. 2 and Rs. 5 coins in the box by solving the equations.
	iii.	Solve $x^2 = 9x + 36$

5.	i.	Find the value of $\log_{10} 25 + \log_{10} 20 - \log_{10} 5 - 2$
	ii.	Solve $\log_2 10 + \log_2 8 - \log_2 x = \log_2 16$
	iii.	Find the value of $\dfrac{328.2 \times 5.86}{40.34}$ using logarithmic table.

6.	i.	Simplify $\dfrac{x+2}{x^2-4} + \dfrac{1}{x+2}$
	ii.	If $x^2 + bx + 12 = (x + c)(x + 4)$ Find the value of b and c.
	iii.	Simplify $(2x-1)^2 + 5x + 2$
	iv.	'B' received Rs. 20 less than and twice of the money that 'A' received. If 'A' gives Rs. 20 to the B, sum of their money equal to the Rs. 220. Taking the value of the money that A had at the beginning as 'x' and find the value of the money belonging to B.

Part B

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7.	Using a pair of compasses and a straight edge with cm/mm scale only and showing the construction lines clearly.
	i. Construct the triangle PQS, PQ = 6 cm, QPS = 60^0 and PS = 4 cm.
	ii. Construct the parallelogram PQRS by locating 'P' and 'R' points opposite sides of line QS of the triangle PQS.
	iii. Construct the Locus of a point which is equidistance to the sides PS and PQ then name the point O where the intersection of above loci and side SQ.
	iv. Find the value of QRS? Write the reasons.
	v. Construct a perpendicular from O to the side PQ.

8.	a) Shade and represent in Venn diagrams separately.
	i. $(A \cap B)'$
	ii. $(A \cap B') \cup (A' \cap B)$
	b) There are 40 children in a class of mixed school 10 out of them are write in left hand. There are 20 girls in the school and 12 boys are write in right hand.
	i. Include these data in a Venn diagram.
	ii. Find the number of boys who write in left hand.
	iii. How many children write in right hand?
	iv. How many girls who write in left hand?

2

9. a) Length, breadth and height ofcuboidical water tank are $2m, 1\frac{1}{2}$ m and 1m respectively. On an occasion when the tank was completely filled with water it took 60 minutes for the tank to be emptied by a pipe.

    i.   Find the rate at which water flow through the pipe. (Assume that the water flowed though the pipe uniformly)
    ii. How much time will it take to empty the tank completely using a pipe through which water flow at 120 litres per minutes.

    b) Find the time it takes for a train of length 60 m travelling at a uniform speed of 72 km h^{-1} to pass a bridge which is 140 m long.


10. The table shows the number of eggs sold per day at a shop in last month.

Number of eggs	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89	90 - 94	95 - 99
Number of days	2	1	7	12	5	2	1

    i.   Write the model class of the distribution.
    ii. Calculate the mean number of eggs sold in a day to the nearest whole number.
    iii. If the seller obtain Rs. 8 profit per egg. Find the mean profit obtain by selling the eggs in one month.
    iv. Show that percentage of selling 80 or more than 80 eggs in a day is more than 66%.

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11. In the triangle PQR, PQ = QR and 'O ' is the midpoint of PR, copy this diagram to the your answer script then mark all information. The line QO is produced to 'S' such that QO = OS. Join the RS and Show that QR = RS, then prove that PQRS is a rhombus.

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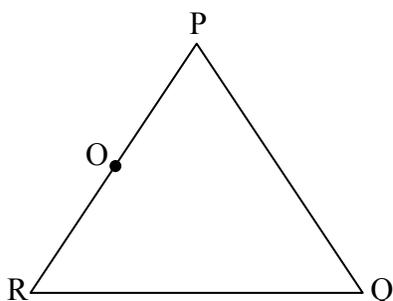
12. In the triangle PQR, PQ = PR and TS = TR. The line 'TS' is drawn through the point T. such that 'T' lies on the PR and which is parallel to the QP.
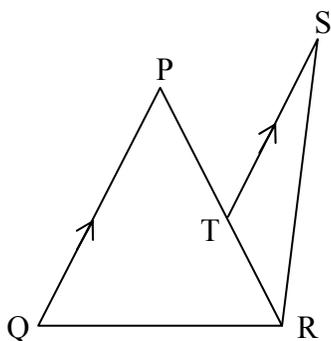
    i.   Copy this diagram to the your answer script and include all information.
    ii. Name the angle equal to the sum of $T\hat{R}S + T\hat{S}R$.
    iii. Show that $Q\hat{P}R = 2\ T\hat{S}R$
    iv. Show that $S\hat{R}Q = 90^0$.