

 VISAKHA VIDYALAYA  
 COLOMBO 05

Visakha Vidyalaya - Colombo 5

Second Term Test - 2020

Mathematics I

Grade 11

Time : 2 hours

Name / Index number .....

❖ Answer all questions on this paper itself

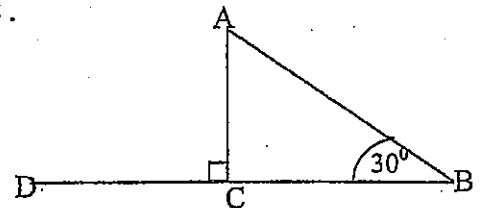
Part A

1) Find the total amount received after one year for a deposited of Rs. 10 000 on simple interest.

 2) Find the time taken to travel a distance of 120km with the speed  $48\text{kmh}^{-1}$ 

 3) If  $\log_5 125 = x$  find the value of  $x$ .

 4)  $\frac{8}{3x} - \frac{2}{3x}$  Simplify and keep in the simplest form.

 5) Using the given information in the diagram find the angle  $\hat{BAC}$ .

 6) 15 men take 12 days to complete a certain task. How many days will be taken by 15 men to complete  $\frac{1}{4}$ th of the above task.

 7) Find the least common multiplier of  $6a^2bc$ ,  $9ab^2c$ .

 8) Find the two consecutive integers of which  $\sqrt{71}$  lie between.

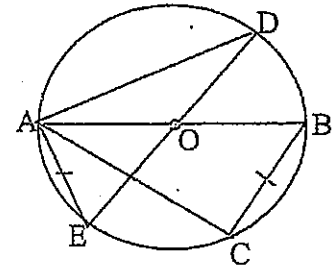
9) In the given prism area of the cross section  $60\text{cm}^2$  and volume is  $1200\text{cm}^3$ . Find the length of the prism.

10) C and D are two sets such that  $n(C) = 18$ ,  $n(D) = 22$  and  $n(C \cup D) = 40$ . Find  $n(C \cap D)$  and state the special characteristic of the two sets C and D.

11) Factorize  $1 - 25x^2$

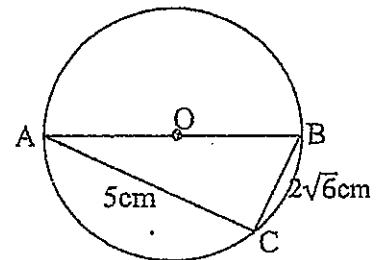
12) Among each 100 cellular phones imported from China 7 are defectives find the possible number of defectives among 50 000 cellular phones.

13) Points A, B, C and E lie on the circumference of the circle with O. AB and DE are diameters. If  $AE = BC$  prove that triangles ABC and ADE are congruent.



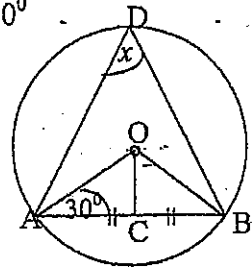
14) Solve  $(2x - 1)(3x + 2) = 0$

15) AB is a diameter of the circle with centre O. Using the given data find the radius of the circle.

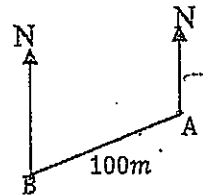


16) The mean of weights of 40 children is 54 kg. If there is another child with weight 64 kg, find the mean of the weights of all children

- 17) In the circle with centre O, mid point of the chord AB is C. If  $\widehat{OAC} = 30^\circ$  find the value of  $\widehat{ADB}$ .

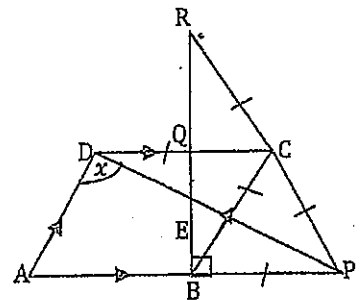


- 18) The bearing of B from A is  $235^\circ$ . Write down the bearing of A from B using the given length.

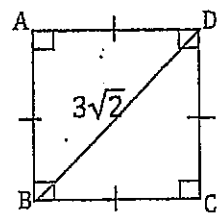


- 19) Write down the co-ordinates of the maximum point of the graph of the function  $y = 3 - (x + 2)^2$

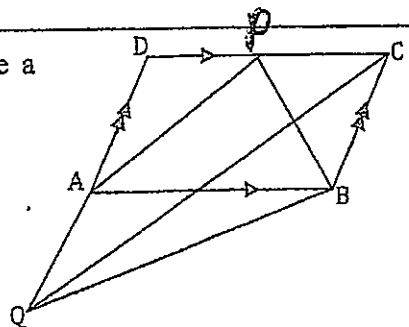
- 20) ABCD is a ~~parallelogram~~ <sup>trapezium</sup>.  $RC = CP = PB = BC = CD$ . Find  $x$ .



- 21) In the square ABCD length of the diagonal BD is  $3\sqrt{2}$ . Find the area of ABCD.

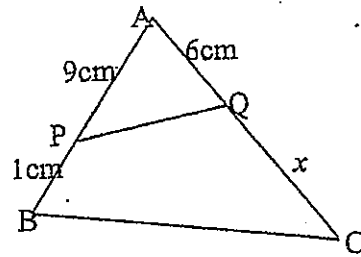


- 22) ABCD is a parallelogram. Side DA is produced to Q. name a triangle whose area is equal to the area of  $\triangle ABP$  with reasons.



- 23) Find the equation of the straight line through  $(0, -1)$  and parallel to the line whose gradient is  $-\frac{2}{3}$  and intercept 2.

24) In the triangle  $ABC$   $\hat{P}Q = \hat{C}$ . Find  $x$ .



25)  $AB$  is a fixed line. Point  $C$  varies but fixing the area of  $\triangle ABC$  a constant. Sketch the locus of point  $C$  and explain that locus.

### Mathematics - PART B

• Answer all questions.

(1) A man donated  $\frac{1}{8}$ th of his monthly wage to a charity society and saved  $\frac{1}{12}$ th of it.

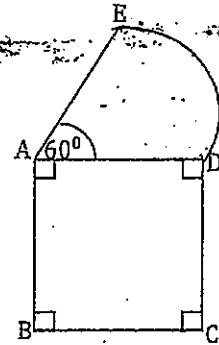
(i) Find the total fraction of money given for charity and saved.

(ii) He spend  $\frac{12}{19}$ th of the rest for food. Write down the fraction spend for food out of total amount.

(iii) Now find the balance fraction of the wage.

(iv) When he spend Rs. 7500 for transport  $\frac{1}{6}$ th of the wage was remaining in hand. Find his total wage.

(2) The given diagram consists of a square ABCD and a sector ADE. The length of a side of the square is 21 cm. ( $\pi = \frac{22}{7}$ )



- (i) Find the area of the sector ADE.
- (ii) Find the length of the arc DE.
- (iii) Find the perimeter of the given shape.
- (iv) A right-angled triangle BCP is marked inside the square where one side is BC and other side is on AB. Area of this triangle is half of the sector. Mark the triangle in the above diagrams with the measurements.

(3) Tharani bought 5 000 shares each per Rs. 28 from company A. The company pays annual dividend of Rs. 6 per share.

- (i) Find the amount invested by Tharani.
- (ii) Find the annual dividends income she received from the company.
- (iii) After receiving annual dividends she sold all the shares as 3000 shares per Rs. 32 and rest of the shares per Rs. 36. Find her capital gain due to selling all the shares.
- (iv) She spent the total amount she received by selling all the shares to buy shares of company B whose market price of a share is Rs. 40. If she gained total capital of Rs. 21 000 from company B find the annual dividend per share.

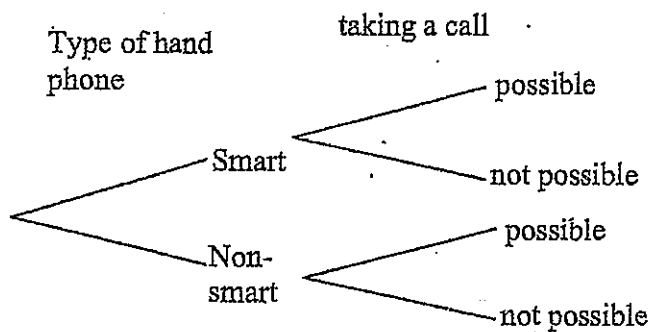


(ii) Name the event obtaining 3 in the first toss as A and the event obtaining 2 in the second toss as B and mark them in the grid.

(iii) Write down  $P(A \cap B)$  and state the special name to identify such pair of events.

(b) Among the number of participants in a survey based on the type of hand phone they have, 40% of them had smart phones where others had non-smart hand phones. The possibility of taking a call by a person who does not possess a hand phone is 0.9.

(i) Make the above information in the following tree diagram



(ii) Find the probability of taking a phone call through <sup>of the phones</sup> above phones.



Visakha Vidyalaya -Colombo 5

Second Term Test - 2020

Mathematics II

Grade 11

Time : 3 hours

Name / Index number .....

Choose 5 questions from part A and 5 questions from part B to answer 10 questions

Part A

(Answer only 5 questions)

(1) A refrigerator priced Rs. 70 000 can be purchased by making a down payment of Rs. 10 000 and paying the rest <sup>in 2 years</sup> by equal monthly installments of Rs. 2687.50. If the interest is calculated on the reducing balance, find the annual interest rate.

(2) The following table is prepared to draw the graph of the function  $y = 3 + 2x - x^2$

x	-2	-1	0	1	2	3	4
y	-5	0	3	.....	3	0	-5

- (i) Find the value of y when  $x = 1$ .
- (ii) Draw the graph of the function taking 10 small divisions the x and y axes to be one unit.
- (iii) Write the above function in the form  $y = b - (x + a)^2$  and find the value of a and b.
- (v) Find the range of x for which  $y \geq -2$ .
- (vi) Write down the equation of the function when the above graph is displaced by one unit to the negative direction of the x axis.

(3) (a) When it is observed from the top of a hill of height 200m, the angles of depression of a man x, standing on a horizontal road down the hill is  $70^\circ$  and his car halted beyond y is  $50^\circ$ . <sup>Angle of depression of the car at y from the bottom of the hill is  $50^\circ$</sup>

- (i) Mark the above information in a scaled diagram using the scale 1: 2 000.
- (ii) Using it, find the horizontal distance between x and y.
- (iii) Find the angle of elevation of the man on the top of the hill from a man z on the horizontal road 60 m beyond y.



(4) The following table represents the masses of 100 grapes measured in grams.

Mass	0-5	5-10	10-15	15-20	20-25	25-30	30-35
Of grapes (frequency)	9	16	30	25	12	6	2

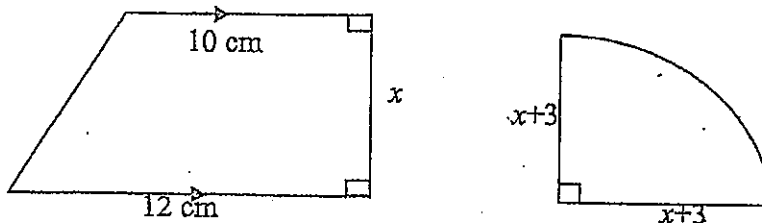
- Write down the modal class.
- Using a suitable assumed mean or otherwise find the mean mass of a grape.
- Using the mean find the number of grapes included in 1kg of grapes to the nearest integer.
- If the price of 1 kg grapes is Rs. 1 200 find the price of one grape.

(5) (a) In a group of tourists the number of local tourists is 5 more to three times of foreign tourists in visiting a certain museum the one local tourist ticket is Rs. 75 and the price of one foreign tourist ticket is Rs. 500. The total amount spend to buy tickets was Rs. 11 250.

- Take the number of foreign tourists as  $x$  and the number of local tourists as  $y$  and build two simultaneous equations.
- Solve the equations and find the number of local tourists and the number of foreign tourists.

(b) Maheshi had Rs. 500 in hand and that was not sufficient to buy 6 books each costs Rs.  $x$  and 4 pens each costs Rs. 14. Write down an inequality for above information and find the least possible value for  $x$ .

(6) The area of the trapezium and the sector are equal.



- Build a quadratic equation including  $x$ .
- Solve it and find the value of  $x$  to the nearest integer (Take  $\sqrt{7} = 2.64$  and area of a circle of radius  $r$  is  $\pi r^2$ ).
- Find the radius of a circle whose area is equal to the above trapezium.

**Part B**

(Answer only 5 questions)

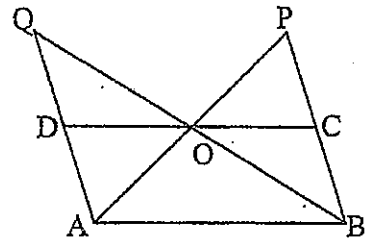
- (7) There is a geometric progression with summation of the first two terms is 24 and 3<sup>rd</sup> term is 2.
- Show that there exist 2 such geometric progressions.
  - Write the first three terms of those progressions.
  - In the progression with a positive common ratio find the summation of first 5 terms.

(8) Do the following constructions using a straight edge with scale (cm/mm) and a pair of compasses. Make the lines of construction clear.

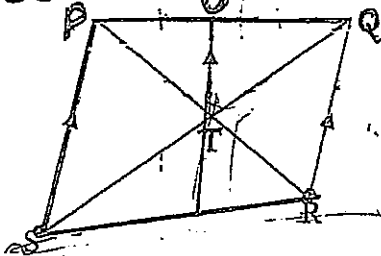
- Construct the triangle ABC such that  $AB = 8\text{cm}$ ,  $\angle BAC = 45^\circ$ ,  $AC = 6\text{cm}$ .
- Drop a perpendicular from C to AB, and name it as CD.
- Construct the angular bisector of  $\angle CDB$  and mark the point of intersection with BC as E.
- Construct a line parallel to AD through E and mark the point of intersection with AC as F.
- Show that ADEF is a parallelogram and name with reasons a triangle whose area is half of the area of ADEF.

(9) (a) In the diagram  $AD = DQ$ ,  $BO = OQ$ ,  $AO = OP$  and  $BC = CP$ .

- Prove that the midpoint of DC is O.
- Prove that the quadrilateral ABCD is a parallelogram and hence prove that area of  $\triangle AOD + \text{area of } \triangle BOC = \frac{1}{2}(\text{area of parallelogram ABCD})$



(b) In the given diagram,  $PS \parallel UT \parallel QR$  mid point of PQ is U, PR and QS are intersected at T. *UTV is a straight line.*



*Prove that  $UV = \frac{1}{2}(PS + QR)$*

(10) (a) A solid sphere of radius 4cm melted and a right circular cone is made. The ratio between the base of the radius and the height of the cone is 1:2.

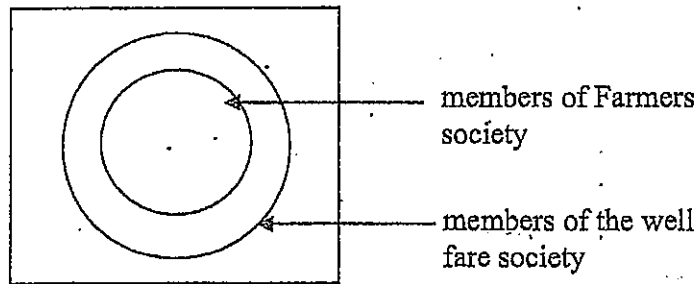
Show that the radius of the base is  $4\sqrt[3]{2}$  and using the logarithm tables find the radius of the base to the nearest first decimal place.

(b) Use logarithm tables to simplify  $\frac{(0.43)^2}{\sqrt{0.91}}$

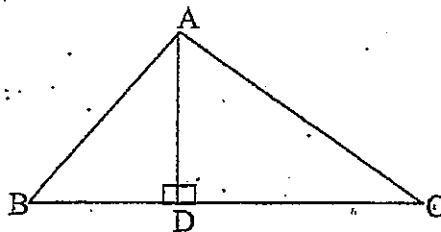
(the volume of a sphere of radius  $r$  is  $\frac{4}{3}\pi r^3$  the volume of a cone with radius  $r$  and height  $h$  is  $\frac{1}{3}\pi r^2 h$  where  $\pi = \frac{22}{7}$ )

(11) Among the 100 farmers living in a village 40 cultivate vegetables, 65 cultivate rice. All the farmers who cultivate vegetables or rice are members of the "farmers society" 12 farmers do not cultivate rice or vegetables but they are members of the "farmers society". 8 people are not members of the above society.

- (i) Mark the above information in a Venn-diagram and write down the number of elements in side each region.
- (ii) Write down the number of farmers who do not cultivate vegetables but rice shade the region for who do not cultivate both vegetables and rice.
- (iii) If all the 100 villages except 2 are members of the well fare society, copy the Venn -diagram and complete.
- (iv) Find the number of members of well-fare society only.



(12) (a) In the triangle ABC,  $AD \perp BC$ . Prove that  $AB^2 - AC^2 = BC^2 - 2BC \cdot DC$



(b) Two produced chords AB and ~~AC~~ meet at P, line through P parallel to DA meet produced CB at Q. Chord AD and BC intersect at T. ~~prove that~~  $AB:PC = BT:PQ$