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Provincial Department of Education - NWP

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පළමු වාර පරීක්ෂණය - 10 ශ්‍රේණිය - 2020
First Term Test - Grade 10 - 2020

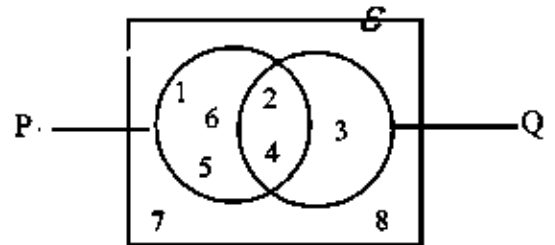**Name/Index No:-** .... **Mathematics - I**   **Time:- 2 hours**

- Answer all the questions on this paper it self.
- Each question in part **A** carries 2 marks and each question in part **B** carries 10 marks.
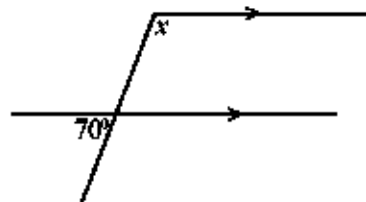
Part A

(1) If $3.4 \times 3.4 = 11.56$ and $3.5 \times 3.5 = 12.25$ find the value of $\sqrt{12}$ to the first approximation.

(2) Expand and simplify.

$$(x-5)(x+2)$$
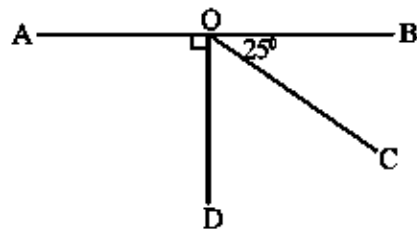
(3) Write the set p′ with elements.
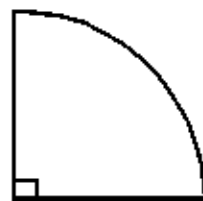

(4) Find the value of x.

(5) The number of coconuts plucked from 10 coconuts trees of Mr. Perera's home garden is given below.

5, 7, 8, 10, 10, 13, 13, x, 14, 17

If the mode of this distribution is 13, find the value of x.

(6)   A water bottle which was bought for Rs. 400 is sold for Rs. 500. Find the profit percentage.

(7)   AOB is a straight line. Find the value of $C\hat{O}D$.

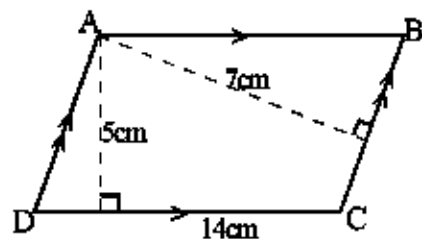(8)   The arc length of a given sector is 44 cm. Find the radius of it.

(9)   Simplify and keep the answer with positive indices. $x^3 \div x^5$

(10)   Factorize.

   $x^2 - 5x - 6$

(11)   In the parallelogram ABCD, find the length
   of the side BC.

(12)   Find the L. C. M. of following algebraic terms.

   $3x^2, \; xy, \; 2y^2$

(13)   Find the value of x.
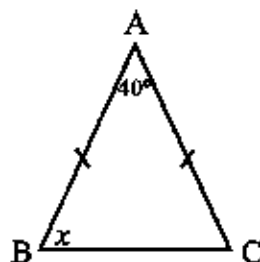
(14) The area of the triangle ABC is 15cm². Find the length of AD.
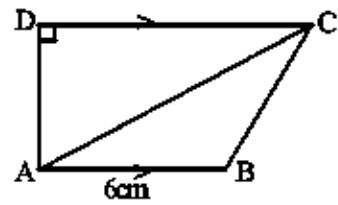
(15) In the triangle ABC, the side BC is produced to D. Find the value of $B\hat{A}C$.
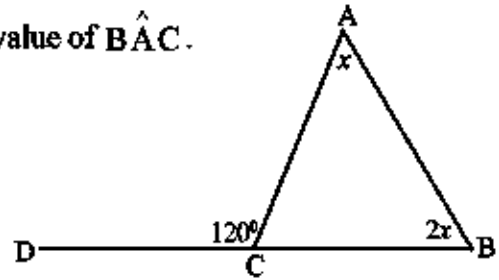
(16) Simplify.

$$\frac{5}{7} - \frac{x+2}{7}$$

(17) In the triangle PQR, if QR $\perp$ PS and QS = SR. Write the case of congruency of the $\triangle$ PQS and $\triangle$ PRS.

(18) 8 men need 6 days to complete a certain task. Find the number of days needed for 12 men to complete the same task.

(19) If AB + CD = 40 cm, find the area of the trapezium ABCD.
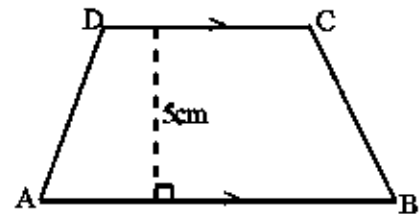
(20) ABC and PQR are two congruent triangles.

Find the value of $A\hat{C}B$
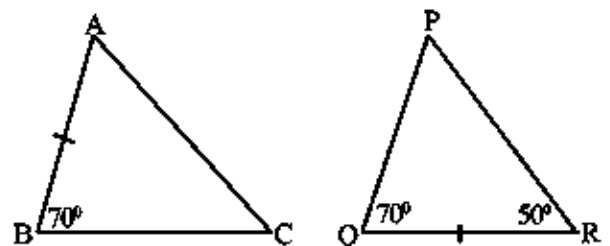
(21) Solve.

$$7 - 2(x - 2) = 1$$

(22) P and Q are two trees with the gap of 20m and a narrow road which is located at equi distance to P and Q is given in the diagram. Using the knowledge about loci, sketch the location of a motorbick such that the distance between the motorbick and P is 20m.
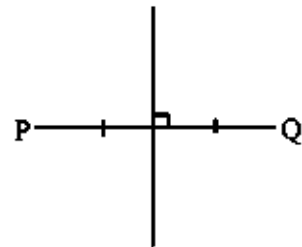
(23) The information about 100 peoples who live in 'Kosgama' Village is given in the following table. When a person is selected randomly from them, find the probability of that person is being a boy.

	Elders	children
Gents	35	13
Ladies	40	12

(24) According to the data given in the figure.

(i)   Find the value of a.

(ii)   Find the value of b.
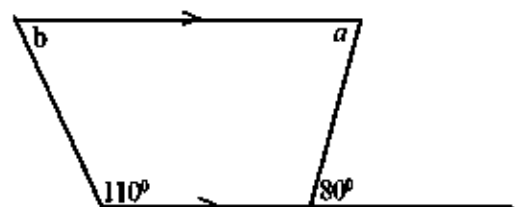
(25) In the function $y - 2x = 3$

(i)   Find the gradient.

(ii)   Find the intercept.

Part B

(1) Nilma who come to the school with a completely filled water bottle, drank $\frac{1}{6}$ of it before the interval and drank $\frac{3}{5}$ of the remainder in the interval.

    (i)   Write the amount of water drank in the interval as a fraction of total amount of water.

    (ii)   Write the remaining water amount as a fraction of total amount of water.

    (iii)   If the remaining water amount is $600m\ell$, find the capacity of the water bottle.

    (iv)   Find the amount of water drank by Nilma before the interval in *ml.*

(2) Given below is a logo that fixed on the entrance of a certain business place. The shaded part is created using a metal sheet and painted in blue colour and the radius of the sector is made by using stainless steel pipes.

    (i)   Find the arc length of the sector.

    (ii)   Find the length of the diagonal of the right angled triangle.

12cm   35cm   40cm
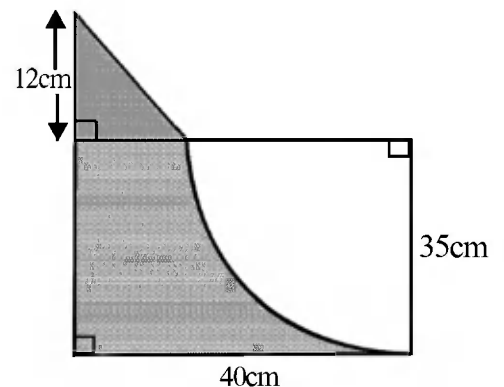
(iii)   Find the perimeter of the metal sheet painted in blue colour.

(iv)   Find the area of the shaded part.

(3)   To select a student for the students parliament of 2019, five students of grade 9A are participated for an election. The following pie chart represents about the number of votes obtained by them from the own class.

(i)   If the number of votes obtained by Nisal and Dananjaya are equal, find the angle of the sector belongs to Nisal.
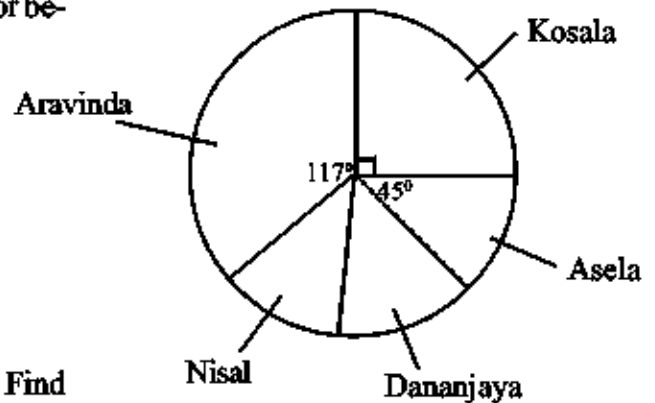
(ii)   If the number of votes obtained by Asela is 5. Find the total number of students in the class.

(iii)   Find the number of votes obtained by the student who selected for the students parliaments.

(iv) In 2020, Asela resigned the school and 6 new students were admitted to this class. The remaining 4 students who contested in 2019 came forward in 2020 and Aravinda, Nisal and Dananjaya obtained same number of votes in 2019. Find the angle of the sector relavant for the number of votes obtaind by Kosala in the pie chart drawn to represent the number of votes obtained by all four candidates in 2020.

(4) In a certain student's hostel the capacity of the water tank is 10 000 *l*. This water volume is sufficient for 50 students for 8 days. After 3 days, 10 students left the hostel.

(i) Find the number of days that 10 000 *l* of water volume is sufficient for a student.

(ii) Find the water volume needed for a student per day.

(iii) After first 3 days, find the remaining water volame in the tank.

(iv) After how many days will remain 250 *ml* of water in the tank.

(5) (a) ε = { a, b, c, d, e, f, g, h }
           X = { a, b, d, e, f}
           Y = { e, d, e }
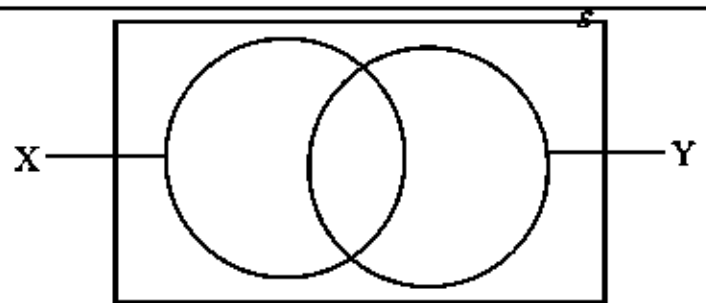
   (i)   Insert the above data in to the given
          venn diagram.

   (ii)   Shade the region $X' \cap Y$ in the venn diagraam.

   (iii) If P = { g, b } write the set P using X and Y.

   (iv)   Write two sub sets of the set with the elements which do not belong to Y but belong te X.

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First Term Test - Grade 10 - 2020

Name/Index No:- .... **Mathematics - II** Time:- 3 hours

- **Answer ten questions selecting five questions from part A and five questions from part B.**
- **Write relevant steps and correct units in answering the questions.**
- **Each question carries 10 marks.**

Part A

(1)

"Sugathapala" Furniture store

10% discount is given for every item buy over Rs. 100000

8% discount is given for every item buy under Rs. 100000
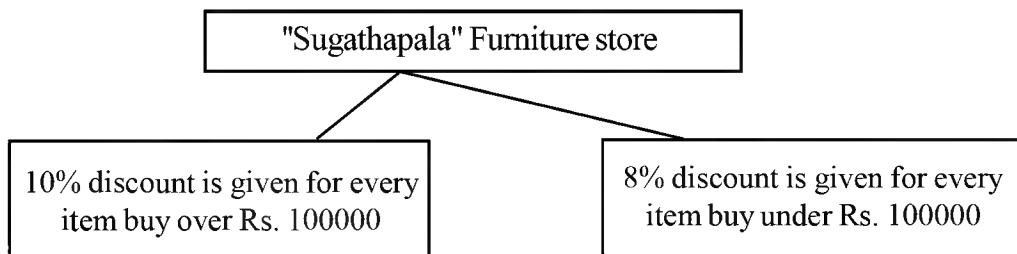
Mr. Sugathapala borrowed a loan of Rs. 150 000 to pay Rs. 3000 as the interest for each month. He bought two sofa sets with the price of Rs. 60 000 and Rs. 90 000 respecfively by investing the total amount of the loan. He marked the price of the sofa set which was bought for Rs. 90000 as Rs. 120 000 and the sofa set which was bought for Rs. 60000 as Rs. 80000. Within the first three months he sold this two sofa sets and paid the loan and the interest for three months. Show that the profit gained by this sales is greater than Rs. 22 000.

(2) An incomplete table of values to draw the graph of the function $y = -x + 2$ is given below.

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

(i) Copy the table on your answer sheet and fill in the blanks.
(ii) Draw the graph of the function $y = -x + 2$ using a suitable cartesian plane.
(iii) Write the 'y' value of the point which intersects the y axis and the above graph.
(iv) Plot 3 correct points relevant to the graph of the function of $y = x$ on the same cartesian plane and write the co-ordinates of the intersection point of the graphs $y = x$ and $y = -x + 2$.

(3) In a square shaped land with the length of a side of $(x + 5)$, grass has grown in rectangular shaped part with the length of $(x + 1)$ and breadth of $(x - 3)$.
(i) Write an algebraic expression for the area of the land which didn't grow grass.
(ii) If the area of the land which didn't grow grass is 88cm^2, find the area of the whole land.

(4) (a) Solve.
$$5x - 2y = 5$$
$$3x - 2y = -1$$
(ii) Factorize.
(i) $2x^2 - x - 6$
(ii) $80 - 5x^2$

(5) The following table is shown about the number of chinese peoples infected with the Corona virus after 50 days of testing.

Number of peoples	4	5	6	7	8	9
Number of days	3	8	15	11	8	5

(i) Find the maximum number of infected peoples found in a day.
(ii) Find the number of infected peoples found in most number of days.
(iii) Find the range of number of infected peoples.
(iv) Find the mean number of infected peoples found in a day to the nearest whole number.
(v) If in the next 10 days it will be reduced the number of infected peoples by half, find the expected number of infected peoples will find within next 10 days.

(6) In a certain town the clock tower is located at the point A in the centre of the town. With respect to A, the hospital at point B is located 100m away on a bearing of 070^0, the bank at point C is located 80m away on a bearing of 220^0. With respect to C, the bus-stand at point D is located 120 m away and to the drection of east.
(i) Draw a rough stetch based on the above information.
(ii) Draw a scale diagram of it using the scale of $1\ cm \rightarrow 20\ m$.
(iii) Find the bearing of A from D.
(iv) Find the shortest distance from bus-stand to hospital.

Part B

(7) A and B are the general terms of two number patterns.
C is the general term of the pattern (A - B)
(i) Find the 11th term of the number pattern 'A'.
(ii) Which term is 55 in the number pattern 'B'.
(iii) Show that the general term of the number pattern 'C' is **-2(n - 3)**
(iv) Find the first term and second term of the number pattern 'C'.
Hence find the difference between two successive terms of it.

(A) $3n + 1$ (B) $6n - 5$

(C)
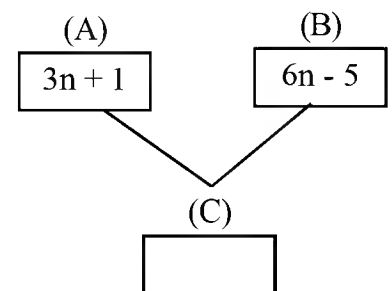
(8) 4.2 l of water is filled to a cuboid shaped glass tank of 30cm length, 20cm breadth and 10cm height. A metalic cuboid with base area $240cm^2$ and height 5cm is completely immersed in the water of the above tank as shown in the diagram.
(i) Find the capacity of the glass tank.
(ii) Find the volume of the immersed cuboid.
(iii) Find the height of the water level 'h' of the glass tank.
(iv) Having the metalic cuboid in the above tank, a metalic cube is put carefully to it. Then, if $400ml$ of water is over flowed, find the length of a side the cube.

10cm

20cm

30cm

h
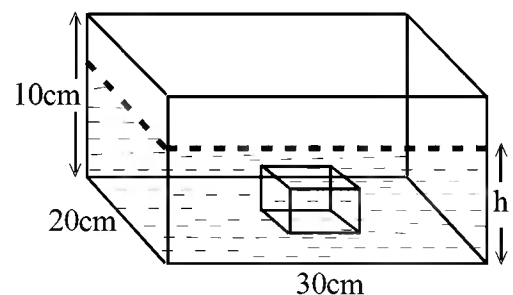
(9) Using the cm / mm scale and a pair of compasses do the following construction.

    (i)   Construct the straigtht line segment PQ = 6cm.

    (ii)   Construct the locus of points equidistance from P and Q and name the point it intersects the PQ as O.

    (iii) Construct the triangle PQR such that $Q\hat{P}R = 60^0$ and point R is located on the above locus.

    (iv) Construct the angular bisector of $P\hat{Q}R$ and name the point M where it intersects the above locus.

    (v)   Construct the circle by taking M as the centre and passes through the points P and Q.

---

(10) In the parallelogram ABCD, the perpendiculars drawn from B and D to the diagonal AC are BP and DQ respectively.

    (i)   Show that $\Delta ABP \equiv \Delta CDQ$ and   AQ = PC.

    (ii)   By.copying the given diagram on to your answer script, draw and name the perpendicular PX drawn from P to AB and the perpmdicular QY drawn from Q to DC. Then show that PX = QY.

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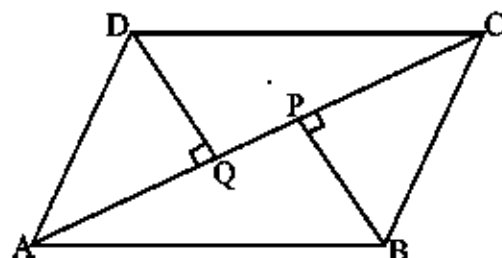
(11) In the isoscelese triangle ABC, AB = AC and AC is produced up to E. The perpendicular drawn from A to BC is AD. The line drawn parallel to AB through C meets the produced AD at F.

    (i)   Show that $B\hat{C}E = B\hat{A}C + A\hat{B}C$.

    (ii)   Show that triangle ACF is an isoscelese triangle.

    (iii) If $B\hat{C}F = 60^0$, show that ABC is an equilateral triangle.

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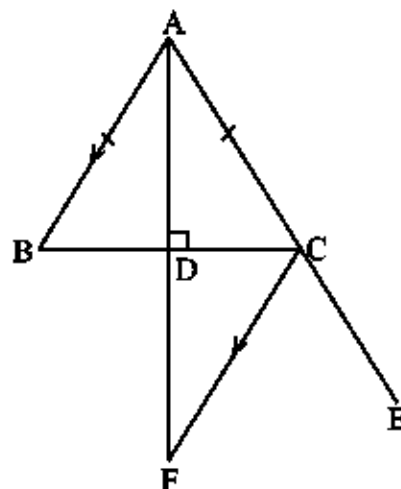
(12) By giving chance to select a card from 10 equal cards numbered from 1 to 10, the way of selecting strudents from 10 students to clean the class room on Monday and Friday is given below.

<div align="center">Group A → clean the classroom on Monday</div>

<div align="center">Group B → clean the classroom on Friday</div>

  A = { the students who obtained a card with multiples of 2}
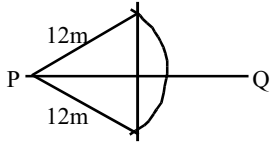
  B = { the students who obtained a card with a number less than 5}

   (i)   Write the set which represents the numbers relevant to clean the classroom on Monday.

    (ii)   Write the set which represents the numbers belonging to the students who did not clean the class room on Friday.

    (iii) Saman selected a card randomly. Write the sample space of the numbers he can be obtained.

    (iv) Find tha probability of Saman being a student of group A.

    (v)   If Piyal had to clean the classroom on both Monday and Friday, find the probability of getting numbers belongs to him.

    (vi) If Saradha had to clean the classroom on an another day, find the probability of getting a number belongs to her.

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First Term Test - Grade 10 - 2020
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Mathematics - Answer Paper

Paper I

Part A

(1)	3.5		2
(2)	$x^2 - 3x - 10$		2
	$x^2 + 2x - 5x - 10$		1
(3)	{ 3, 7, 8 }		2
(4)	110^0		2
	vertically oppsit angle 70^0		1
(5)	13		2
(6)	25%		2
(7)	65^0		2
	90 - 25		1
(8)	28cm		2
	$\frac{1}{4} \times 2 \times \frac{22}{7} \times r = 44$		1
(9)	$\frac{1}{x^2}$		2
	x^{-2}		1
(10)	$(x - 6)(x + 1)$		2
	$x^2 - 6x + x - 6$		1
(11)	10cm		2
	$BC \times 7 = 14 \times 5$		
	or		
	$\frac{14 \times 5}{7}$		1
(12)	$6x^2y^2$		2
(13)	70^0		2
	$A\hat{C}B = x$ or $2x = 140^0$		1
(14)	5cm		2
	$\frac{1}{2} \times 6 \times AD = 15$		1

(15)	40^0		2
	$3x = 120$		1
(16)	$\frac{3 - x}{7}$		2
	$\frac{5 - x - 2}{7}$		1
(17)	S. A. S		2
(18)	4 days		2
	$\frac{8 \times 6}{12}$		1
(19)	(i)	$100cm^2$	2
		$\frac{1}{2} \times 40 \times 5$	1
(20)	60^0		2
	$B\hat{A}C = 50^0$		1
(21)	$x = 5$		2
	$7 - 2x + 4 = 1$		1
(22)			2
(23)	$\frac{13}{100}$		2
(24)	(i)	80^0	1
	(ii)	70^0	1 - 2
(25)	(i)	2	1
	(ii)	3	1 - 2

B කොටස		

(1) (i) $\dfrac{5}{6}$ ----- 1

$\dfrac{5}{6} \times \dfrac{3}{5}$ ----- 1

$\dfrac{1}{2}$ ----- 1 ⎱ 3

(ii) $\dfrac{1}{6} \times \dfrac{1}{2}$ ----- 1

$\dfrac{2}{3}$ ----- 1

$\dfrac{1}{3}$ ----- 1 ⎱ 3

(iii) $1800\,ml$ ----- 2

$600 \div \dfrac{1}{3}$ ----- 1

(iv) $1800 \times \dfrac{1}{6}$ ----- 1

$300\,ml$ ----- 1 ⎱ 2

10

(2) (i) $2 \times \dfrac{22}{7} \times 35 \times \dfrac{1}{4}$ ----- 1

55cm ----- 1 ⎱ 2

(ii) 13 cm ----- 2

5cm obtaining $5^2 + 12^2$ ----- 1

(iii) $40 + 35 + 12 + 13 + 55$ ----- 1

155 cm ----- 1 ⎱ 2

(iv) $40 \times 35 = 1400\,cm^2$ ----- 1

$\dfrac{22}{7} \times 35 \times 35 \times \dfrac{1}{4}$ ----- 1

962.5 cm²

$\dfrac{1}{2} \times 12 \times 5 = 30\,cm^2$ ----- 1

$467.5\,cm^2$ ----- 1 ⎱ 4

10

(3) (i) $360 - (117 + 90 + 45)$ ----- 1

$54^0 \left(\dfrac{108}{2} \right)$ ----- 1 ⎱ 2

(ii) $\dfrac{360 \times 5}{45}$ ----- 1

40 ----- 1 ⎱ 2

(iii) $\dfrac{40 \times 117}{360}$ or $\dfrac{117}{9}$ ----- 1

13 ----- 1 ⎱ 2

(iv) $\dfrac{40}{4} = 10$ ----- 1

$10 + 10 = 20$ ----- 1

$\dfrac{360 \times 20}{45}$ ----- 1

160^0 ----- 1 ⎱ 4

10

(4) (i) 50×8 ----- 1

400 days ----- 1 ⎱ 2

(ii) $\dfrac{10000}{400}$ ----- 1

$25\,l$ ----- 1 ⎱ 2

(iii) $10000 - 50 \times 3 \times 25$ ----- 1

$6250\,l$ ----- 1 ⎱ 2

(iv) $6250 - 250 = 6000$ ----- 1

$\dfrac{6000}{40 \times 25}$ ----- 1

6 days ----- 1

$6 + 3 = 9$ days ----- 1 ⎱ 4

10

(5) (i) for correct regions ----- 4

(ii) correct answer ----- 2

(iii) $(X \cup Y)'$ ----- 2

(iv) {a} {b} {a, b} ----- 1

any two ----- 1 ⎱ 2

10

Paper II

Part A

(1) (i) Rs. 9000 ------------------------------------- 1
Rs. 159 000 ---------------------------------- 1

$$\frac{120000 \times 90}{100}$$ ---------- 1

Rs. 10 8000 --------------------------------- 1
Rs. 73 600 ---------------------------------- 1
108 000 + 73 600 --------------------- 1
Rs. 181 600 -------------------------------- 1
181 600 - 159 000 -------------------- 1
Rs. 22 600 ---------------------------------- 1
22 600 > 22 000 ------------------------- 1
------------------------------------- |10|

(2) (i) 3, -1 --------------------------------------- 1

(ii) Carrect axis ------------------------------- 1
Marking points --------------------------- 1
drawing graph ---------------------------- 1 |3

(iii) 2 ----------------------------------- 1
(iv) by potting at least two points drawing
the graph $y = x$ ------------------------- 3
(1, 1) -------------------------------------- 1 |4
------------------------------------- |10|

(3) (i) $(x + 5)^2 - (x + 1)(x - 3)$------------- 2
$x^2 + 10x + 25 - (x^2 - 2x -3)$ ----------- 2
12x + 28 --------------------------------- 1 |5

(ii) $12x + 28 = 88$ ------------------------ 1
$12x = 60$ ------------------------------ 1
$x = 5m$
10 m------------------------------------ 1
100 m^2 ------------------------------ 2 |5
------------------------------------- |10|

(4) (a) $2x = 6$ ---------------------------------- 1
$x = 31$ -------------------------------------- 1
for substitution ------------------------------ 1
$y = 5$ --------------------------------------- 1 |4

(b) (i) $2x^2 - 4x + 3x - 6$ ------------------- 1
$2x(x -2) + 3(x - 2)$------------------- 1
$(x - 2)(2x + 3)$------------------------- 1 |3
(ii) $5(16 - x)$ ------------------------- 1
$5(4^2 -x^2)$ ---------------------- 1
$5(4 - 2)(4 + x)$---------------------- 1 |3
------------------------------------- |10|

(5) (i) 9 -- 1
(ii) 6 -- 1
(iii) 5 -- 1
(iv) 12, 40, 90, 77, 64, 45 ----------------- 1
328 --------------------------------------- 1
328/50 ----------------------------------- 1
6.56 or 6.5 ------------------------------- 1
7 ------------------------------------- 1 |5

(v) $\frac{7}{2} \times 10$ ------------------------------ 1
35 --- 1 |2
------------------------------------- |10|

(6) (i) sketch with measurements ----------------- 2

(ii) bearing, scale for B ---------------------- 2
bearing, scale for C ---------------------- 2
bearing, scale for D ---------------------- 1 |5

(iii) $312^0 \pm 2^0$ ----------------------------- 1

(iv) 5cm ± 0.1cm ------------------------- 1
100m $\pm$ 2m------------------------- 1 |2
------------------------------------- |10|

Part A

(7) (i) $3 \times 11 + 1$ ----------------------------------- 1
34--------------------------------------- 1 |2

(ii) 6n - 5 = 55 ----------------------------- 1
n = 60/6 -------------------------------- 1
n = 10 ---------------------------------- 1 |3

(iii) 3n + 1 -(6n - 5) ---------------------- 1
-3n + 6 ---------------------------------- 1 |2

(iv) 3, 0 ------------------------------------- 2
-3 -------------------------------------- 1 |3
------------------------------------- |10|

(8) (i) $30 \times 20 \times 10$ ------------------------------- 1
6000 *ml* or 6 *l*----------------------- 1 |2

(ii) 240×5 ----------------------------- 1
1200 cm^3 --------------------------- 1 |2

(iii) 4200 + 1200 ------------------------- 1
5400 *ml* ------------------------------- 1

$\dfrac{5400}{30 \times 20}$ ------------ 1		
9cm -------------------------- 1 ⌐ 4		
(iv) 1000 cm² ----------------- 1		
10cm ------------------------- 1 ⌐ 2		
----------------------------- 10		

(9) (i) drawing PQ ----------------------------- 1

(ii) for perpendicular bisector --------------- 1
O ------------------------------------- 1 ⌐ 2

(iii) constracting 60^0 ----------------------- 2
for Δ PQR ------------------------ 1 ⌐ 3

(iv) angular bisector ------------------------- 2
for M ---------------------------------- 1 ⌐ 3

(v) constracting circle ---------------------- 1
----------------------------------- 10

(10) (i) AB = DC (opposite side) -------------- 1

$B\hat{A}P = D\hat{C}Q$ (alternate angles) ------- 1

$A\hat{P}B = C\hat{A}D = 90^0$

$ABP\Delta \equiv CDQ\Delta$ (A. A. S) -------------- 1
AP = QC --------------------------------- 1
(correspondingelement of $\equiv \Delta$) --------- 1
AP - QP = QC - QP ----------------------- 1 ⌐ 6
AQ = PC

(ii) copying and drawingperpendicular ----- 2

$\dfrac{1}{2}.AB.PX = \dfrac{1}{2}.DC.QY$ ----------------- 1

AB = DC ------------------------------- 1
PX = QY ------------------------------- 4
----------------------------------- 10

Answer

(11) (i) $F\hat{C}E = B\hat{A}C$ (corressponding $\sphericalangle$) ----- 1

$B\hat{C}F = A\hat{B}C$ (alternate $\sphericalangle$) ------------ 1

$F\hat{C}E + B\hat{C}F = B\hat{A}C + A\hat{B}C$ -------- 1 ⌐ 3

$B\hat{C}E = A\hat{B}C + A\hat{B}C$

(iii) $B\hat{A}D = D\hat{A}C$ ------------------------- 1

$B\hat{A}D = D\hat{F}C$ ------------------------- 1

$\therefore D\hat{A}C = D\hat{F}C$ ----------------------- 1
AC = CF ------------------------------ 1 ⌐ 4

(iii) $A\hat{B}C = 60^0$ --------------------------- 1

$A\hat{C}B = 60^0$ --------------------------- 1

$B\hat{A}C = 60^0$ --------------------------- 1 ⌐ 3
------------------------------------- 10

(12) (i) {2, 4, 6, 8, 10} ------------------------------ 1
(ii) { 5, 6, 7, 8, 9, 10} --------------------------- 1
(iii) S = {1, 2, 3, 4, 5, 6, 7, 8,9 10} ------------- 2
(iv) $\dfrac{5}{10}$ ------------------------------ 2
(v) $\dfrac{2}{10}$ ------------------------------ 2
(vi) $\dfrac{3}{10}$ ------------------------------ 2
----------------------------------- 10