

1.1 Objectives
Paper I
Part A

1. Of the numbers given, selects the numbers that do not give a whole number as the square root.
2. Finds the value of the vertex angle of an isosceles triangle when an angle opposite one of the two equal sides is given.
3. Given the area of a circular lamina in square metres, finds the area of a sector of that lamina of known central angle.
4. Solves an equation with given algebraic fractions.
5. Finds the total number of balls in a bag when the range in which the number of balls of different colours lies and the probability of a ball having a given colour are given.
6. Writes a number given in index form in logarithm form.
7. Given one requirement for a quadrilateral to be a parallelogram, writes the other requirement.
8. Finds the value of a named angle of a right-angled triangle and an angle of another triangle according to given information.
9. Simplifies an expression with algebraic fractions.
10. Given the mid point of a chord of a circle,
 - (i) writes the relationship between the chord and the line joining the centre of the circle and the mid point of the chord.
 - (ii) using that relationship, fills in the blanks of an incomplete statement.
11. Calculates the area of the curved surface of a cylinder when its height and the circumference of the base circle are given.
12. Finds the values of two unknown entries when two matrices and a relationship are given.
13. Writes the equation of a straight line with given intercept which is parallel to a given straight line.
14. Given a diagram showing a line drawn through the mid point of one side of a triangle parallel to another side, which intersects the third side, calculates the length of the given part of that line and the length of the third side using the data given.
15. Given the number of days required by a group of a people to complete a work and the number of days worked,
 - (i) finds the number of man days required to complete the remaining work.

- (ii) finds the number of days required to complete the remaining part by a given number of men.
16. Solves an inequality of the type $ax + b \geq c$ and indicates the solution on a number line.
17. Given the diagram of a triangular prism with measurements marked on it and one of its rectangular faces, draws the other two rectangular faces with measurements.
18. Given the percentage of the tariff and the value of an item, calculates the value of the item after paying the tariff.
19. Given the diameter of a circle and a diagram of the circle with four connected points on its circumference, satisfying certain conditions
(i) finds a named angle. (ii) finds another named angle.
20. Calculates the cosine of an angle given its sine.
21. Given a histogram representing the marks scored by a group of students, writes the number of students scoring marks within a given class interval and the number of students who appeared for the examination.
22. Given an angle as x of a cyclic quadrilateral, one side of which is the diameter of the corresponding circle, finds two other named angles in the figure in terms of x .
23. Writes a trinomial quadratic expression as a square and finds the factors of an expression which is the difference of two squares.
24. According to a given requirement, marks the location of a line using knowledge on loci.
25. Selects correct statements according to the information presented in the given Venn diagram.

Part B

1. Given how a portion of a whole is kept with self and the rest is divided among some others,
(i) calculates the remaining part excepting the part retained by self.
(ii) calculates the portion received by a named person.
(iii) calculates the remaining portion after apportioning to two individuals.
(iv) calculates the extent of the whole when the extent of a portion is given.
(v) calculates the value of a remaining portion when the value of the part separated for self is given.

2. When a diagram of a rectangular land with a shaded right angled sector at one end is given,
- finds the length of the curved boundary of the shaded part.
 - calculates the area of the shaded part.
 - finds the area of the remaining portion of land excepting the shaded area.
 - draws with measurements on the given diagram, how a right angled-triangular portion of land which is of area a multiple of the area of the shaded region is separated out so that the breadth of the rectangle is one boundary.
3. Given the market price of a share of a company and the amount invested in it,
- finds the number of shares bought.
 - finds the annual dividend income when the annual dividend paid per share is given.
- When it is said that all the shares are sold on an occasion when the market price of a share has gone up,
- finds the capital gain.
 - indicates the total income as a percentage of the amount invested.
 - finds the income if another amount is invested under the same conditions.
4. (a)
- Describes and writes a named set using a Venn diagram drawn with elements.
 - Writes in sets notation, the shaded area of the Venn diagram.
 - Writes the number of elements in the intersection of two sets given in the Venn diagram.
- (b)
- Indicates by a point graph, the sample space that includes the information in relation to the availability of the bus type when commuting by three types of buses running in a route.
 - Writes the probability of getting buses not belonging to the same type when commuting back and forth.
5. (i) Fills in the blanks in the frequency column and the cumulative frequency column in the given table.
- (ii) Writes the class interval to which the highest frequency of the given frequency distribution belong.
- (iii) Draws the cumulative frequency curve of the given frequency distribution on the two axes given.
- (iv) Calculates the minimum amount that may have been collected from all the students in the given frequency distribution.

Paper II

1. Given the loan amount that has to be paid within a stipulated period of time under a given annual interest rate,
- calculates the total interest required to be paid during the given period.
 - calculates the monthly instalment with interest.
 - finds the monthly income received if the loan obtained is deposited at a given monthly interest rate.
 - point out with reasons whether by the end of the due period of the loan, the income from the deposited sum exceeds the loan obtained.

2. (a) (i) Completes an incomplete table comprising of values corresponding to the values of x satisfying a function of the type $y = (x \pm a)(x \pm b)$ where a and b are integers.
- (ii) Using the above table, draws the graph of the function within the given range calibrating the axes according to a suitable scale.
- (b) Using the above graph,
- (i) writes the axis of symmetry of the graph.
- (ii) finds the roots of the equation $y = 0$.
- (iii) writes the value interval of x where $y \leq 0$
- (c) Decides the equation of the quadratic function y of which the coefficient of x^2 is 1, when the roots of the equation $y = 0$ are given.
3. (a) (i) Develops a pair of simultaneous equations using the information given.
- (ii) Calculates the values of the two unknowns solving the pair of simultaneous equations.
- (iii) Decides how an amount of money should be handled according to given information.
- (b) (i) Solves the given quadratic equation using the formula or any other method and shows that the solution is a given expression.
- (ii) Finds the value of the positive root by substituting the given value.
4. (i) Simplifies an algebraic expression containing the square of a binomial expression.
- (ii) Factorises an expression of the type $ax^2 + bx + c$.
- (iii) Subtracts two algebraic fractions with unequal algebraic expressions in the denominator.
- (iv) Indicates given information by a matrix and writes its order.
5. (a) (i) Marks the given information in a diagram when the distance between a tower and a tree and the angle of elevation of the top of the tower from the top of the tree are given.
- (ii) Calculates the height of the tower to two decimal places using trigonometric tables.
- (b) Given a table containing the distance traveled by a moving object and the time taken.
- (i) draws the distance-time graph to illustrate the motion of the object.
- (ii) shows that a given relationship between the speed of the object during the first and last six seconds is true.
6. (i) Writes the modal class of a given frequency distribution.
- (ii) Decides on the truth or falsehood of the prediction made in relation to an event using the mean found.
7. (a) (i) Using the information given, writes the first three terms of a progression of numbers and decides what progression it is.
- (ii) Calculates which term of the progression a given value is.
- (ii) Explains with reasons whether a given target can be achieved.
- (b) Finds the sum of an initial number of terms of a given geometric progression.

8. In a right angled triangle, when the point at which a perpendicular drawn to the mid point of one side meets another side is given
- (i) draws a diagram to show the given information and shows that a named triangle is an isosceles triangle.
 - (ii) verifies a given rider.
9. Given a diagram with a diameter of a circle, a cyclic quadrilateral of which that diameter is a diagonal, and a tangent drawn to the circle from a terminal point of the diameter,
- (i) finds the value of the angle subtended by an arc on the centre when the value of the angle subtended by that arc on the circle is given.
 - (ii) writes correctly the relevant theorem for two angles in the same named sector in the diagram to be equal.
 - (iii) gives reasons for a given angle to have a given value.
 - (iv) presents reasons for a named triangle in the diagram to be an equilateral triangle.
 - (v) presents reasons for two lines in the given diagram to be parallel or not.
10. (i) Constructs a triangle when the lengths of two sides and the included angle of those two sides are given.
- (ii) Constructs the locus of a point equidistant from the two vertices of the triangle.
 - (iii) Constructs the circle that touches the terminal point of a side of the triangle and passes through another vertex of the triangle.
 - (iv) Measures and writes the radius of that circle.
 - (v) Marks a point that is equidistant from two vertices of the triangle and is at a given distance from the two points.
 - (vi) Given the length of a side, constructs the rhombus in which the diagonal is a named side of the constructed triangle.
11. (a) Shows that the number of spheres of given radius that can be made without wasting metal by melting the metal rod of given length and uniform cross section radius which is given in algebraic form, is equal to a given expression.
- (b) Calculates the value of an expression of type $\frac{a^2b}{c}$ using the logarithms tables where a, b are numbers between 0 and 10 and c is less than 30, and gives the answer to two nearest decimal places.
12. (a)(i) Completes an incomplete Venn diagram with three intersecting sets using given information.
- (ii) Finds the number of elements belonging to an area in the Venn diagram described in words.
 - (iii) Calculates the number of elements belonging to a named area.
- (b)(i) Represents two events obtained from a selection test with relevant probabilities in a tree diagram.
- (ii) Finds the probability of an event represented by the tree diagram.
 - (iii) Finds the number of personnel relevant to a named event given the number of individuals facing an examination.

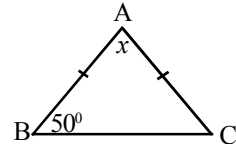
1.2 Paper
Mathematics I - Part A

Answer all the questions in this paper itself.

1. From the following, select and write the numbers which do not give a whole number as the square root.

4, 16, 10, 9, 12

2. Find the value of x according to the data in the figure.



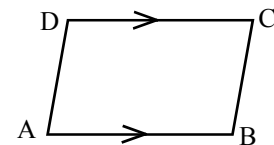
3. The area of a circular lamina is 44 m^2 . What is the area of a sector cut from it with an angle of 90° at the centre?

4. Solve $\frac{x+1}{5} = 2$.

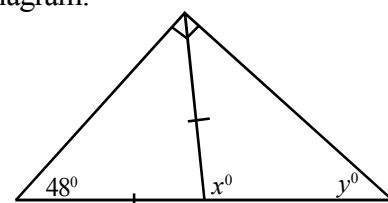
5. A bag contains between 10 and 20 identical balls of different colours including red. When a ball is randomly taken from it, its probability of being a red ball is $\frac{3}{7}$. How many balls were in the bag?

6. $5^3 = 125$. Write this in logarithm form.

7. Write a requirement for the quadrilateral shown in the diagram to be a parallelogram.

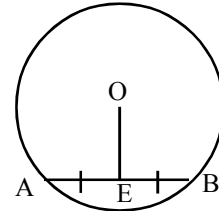


8. Find the values of x and y using the information given in the diagram.



9. Simplify $\frac{x}{4} - y + \frac{x}{2} + 4y$.

10. AB is a chord of the circle of centre O shown in the figure. AE = EB.
 (i) What is the relationship between OE and AB?
 (ii) Fill in the blank and complete the following expression.
 $OB^2 = OE^2 + \dots\dots$

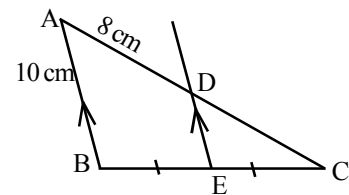


11. The circumference of the base of a right-circular cylinder is 15 cm. Its height is 10 cm. Find the area of the curved surface of the cylinder.

12. $A = \begin{bmatrix} 2 & 5 \\ 3 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$, $2A - B = \begin{bmatrix} x & 7 \\ 4 & y \end{bmatrix}$. Find the values of x and y.

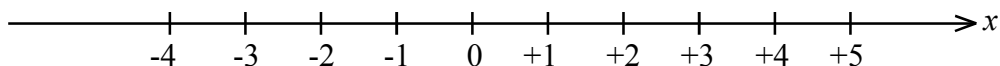
13. Write the equation of the straight line with intercept 4 which is parallel to the straight line given by $y = 3x - 2$.

14. In the diagram, AD = 8 cm and AB = 10 cm. As per the information given, find the lengths of the sides AC and DE.

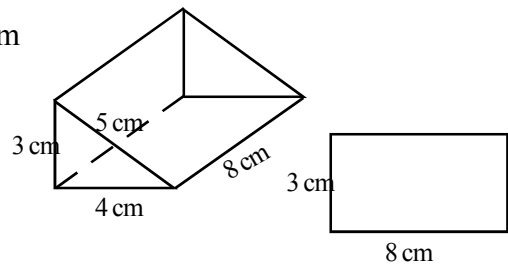


15. 10 men can complete a work in 6 days. After working for two days, two men didn't turn up for work.
 (i) How many man days of work are left after two days?
 (ii) How many days will be taken by 8 men to complete the rest of the work by 8 men?

16. Solve the inequality $3x + 2 \geq 8$ and indicate the solution on the following number line.

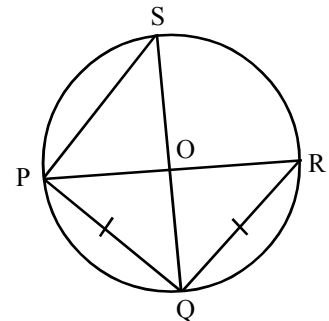


17. One rectangular face of the prism given in the diagram has been drawn. Draw with measurements, the other two rectangular faces.

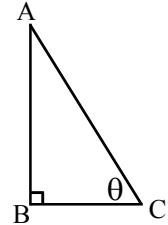


18. A 12% tariff is charged for an item. Find the value of an item worth Rs. 18 000 after paying tariff.

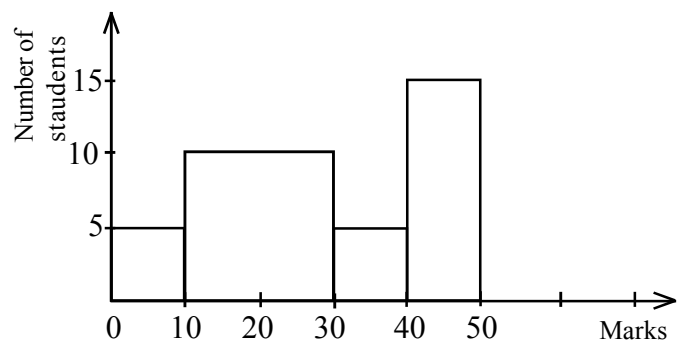
19. PR is a diameter of the circle of centre O shown in the figure. Point Q is located on the circle. $PQ = QR$.
- (i) What is the value of \hat{PQR} ?
- (ii) What is the value of \hat{PSQ} ?



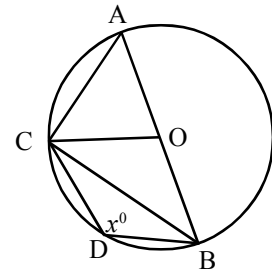
20. Find the value of $\cos \theta$ if $\sin \theta = \frac{12}{13}$.



21. A histogram drawn to represent the marks scored by several students in a mathematics test is shown in the diagram.
- (i) How many students have scored marks between 10 and 30 ?
- (ii) What is the total number of students who appeared for the test?



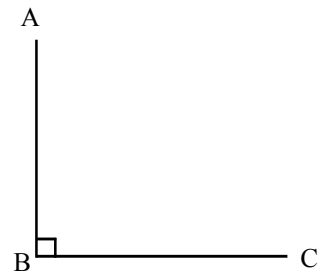
22. Points C and D are located on the circle shown in the figure where AB is a diameter. If $\widehat{CDB} = x^\circ$, write the magnitude of each of the following angles in terms of x° .



- (i) \widehat{CAB}
- (ii) \widehat{CBA}

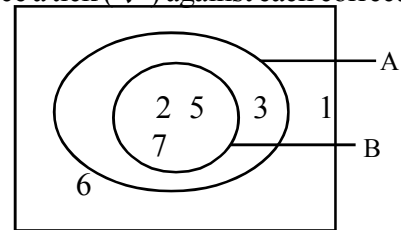
23. (i) Write the expression $x^2 + 2ax + a^2$ as a perfect square.
 (ii) Using it, factorise $x^2 + 2ax + a^2 - 9$.

24. A row of ornamental plants should be placed at an equal distance from the two walls AB and BC depicted in the figure. Using the knowledge on loci, draw in the figure how this row of plants should be placed.



25. According to the information given in the Venn diagram, place a tick (✓) against each correct statement.

$A \cap B = B$	
$A \cap B = A$	
$A \cup B = B$	
$A \cup B = A$	

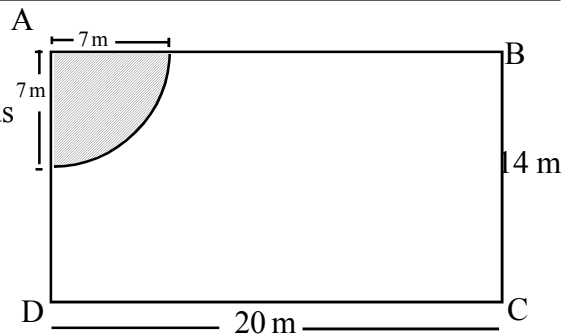


Part B

Answer all the questions in this paper itself.

1. A father reserved $\frac{1}{5}$ th of a land for himself and divided the remaining portion among his children such that his son received $\frac{1}{2}$ of this portion and the rest was divided equally among the three daughters.
 - (i) What fraction of the total land is the extent of land divided among the children?
 - (ii) What fraction of the total land was received by the son?
 - (iii) What fraction of the total land is left to be divided among the three daughters?
 - (iv) If one daughter received 30 ha, find the area of the total land.
 - (v) If the value of the part kept by the father was Rs. 4.5 million, what is the value of the part received by a daughter?

2. ABCD is a rectangular plot of land owned by Saman. The leafy vegetable 'gotukola' has been grown in the shaded area which is a sector of radius 7m. (Take $\pi = \frac{22}{7}$)



- (i) Find the length of the curved boundary of the section where gotukola has been grown.
- (ii) What is the area of the section in which gotukola has been grown?
- (iii) What is the area of the remaining part of the land where gotukola is not grown?
- (iv) Saman plans to separate out a right-angled triangular plot of land so that its area is three times the gotukola grown area. If BC is to be one of its boundaries and the other boundary is to lie on DC, sketch the plot of land that can be separated out with measurements on the diagram given.

3. A man invested Rs. 50 000 to buy shares when the market price of a share of 'Lanka' company became Rs. 10.
- (i) How many shares did he buy?

 - (ii) If an annual dividend of Rs. 2 is paid for a share, find his annual income from dividends.

When the market price of a share of 'Lanka' company became Rs. 14 the man sells all his shares.

- (iii) Find his capital gain.

- (iv) If he sold all his shares for the aforesaid market price after receiving the annual dividend, indicate the sum of his dividend income and capital gain as a percentage of the invested amount.

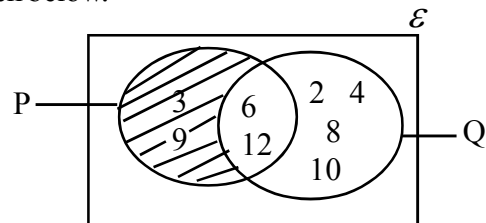
- (v) If an investor receives the above dividends and capital gain, what is the total income he gets at the end of the year if Rs. 100 000 is invested?

4. (a) Answer the questions asked on the Venn diagram given below.

- (i) Describe set P in words.
 $P = \{ \dots \dots \dots \}$

- (ii) Indicate the shaded area in set notation.

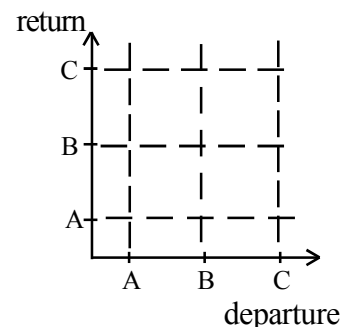
- (iii) Fill in the blank. $n(P \cap Q) = \dots \dots \dots$



(b) A, B and C are three types of buses running on a particular route. A passenger has an equal chance of travelling in these three types of buses.

- (i) Indicate on the grid the sample space of the type of bus a man will travel on during his departure and return.

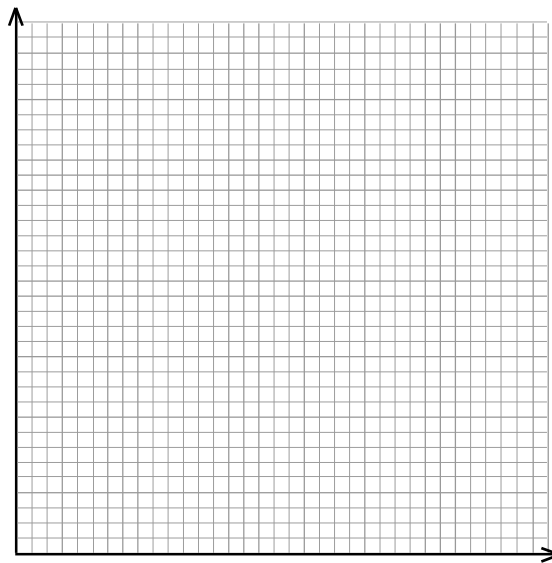
- (ii) Mark on the grid the event of the passenger getting buses not belonging to the same type during the departure and return journeys and find its probability.



5. Details of the donations made by grade 10 students for a pirth chanting ceremony at school are given below. (If x belongs to the class interval $0 - 20$, then $0 \leq x < 20$.

Class interval (Donation)	Frequency (Number of students)	Cumulative frequency
0 - 20	8	8
20 - 40	12	20
40 - 60	15	.....
60 - 80	10	.....
80 - 100	.....	50

- (i) Complete the above table.
- (ii) Write the class interval to which the donation made by the highest number of students belong.
- (iii) Draw the cumulative frequency graph on the given axes.



- (iv) If money was collected like this, what is the minimum amount of money that may have been collected from all the students?

Mathematics II

Three hours

- Answer 10 questions selecting five questions from part A and five questions from part B
- Every question is worth 10 marks.
- The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$.
- The volume of a sphere of radius r is $\frac{4}{3} \pi r^3$.

Part A

Answer five questions only

1. A sum of Rs. 360 000 is obtained from a financial institution at an annual simple interest rate of 12% under the agreement of paying off the loan within a period of 3 years.
- (i) What is the total interest that should be paid in 3 years?
 - (ii) If the instalments are paid equally and monthly, find the monthly instalment with the interest.
 - (iii) What is the monthly income received if the loan amount is deposited in another institution at a monthly interest rate of 2%?
 - (iv) By the end of the loan period, will the income received from the deposit exceed the loan amount? Give reasons for your answer.

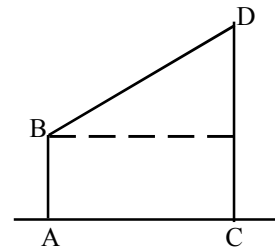
2. (a) An incomplete table which gives values of y corresponding to some of the x values of the function $y = (x + 2)(x - 1)$ is indicated below.

x	- 4	-3	-2	-1	0	1	2	3
y	10	4	0	-2	-2	....	4	10

- (i) Complete the blank in the table.
 - (ii) Draw the graph of the function within the range given, selecting a suitable scale.
- (b) Using the graph,
- (i) write the equation of the axis of symmetry of the graph.
 - (ii) find the roots of the equation $y = 0$.
 - (iii) write the range of value of x where $y \leq 0$.
- (c) Write the equation of the quadratic function y of which the roots of the equation $y = 0$ are -1 and 3 and the coefficient of x^2 is 1.
3. (a) The price of a guava (pera) fruit is greater than the price of an orange by Rs. 15. Price of two oranges and a guava fruit is Rs. 165.
- (i) Construct a pair of simultaneous equations using this information.
 - (ii) Find separately, the price of an orange and the price of a guava fruit.
 - (iii) Sunil has Rs. 230. Find the number of each type of fruit he can buy separately without leaving any balance.

- (b) (i) Solve the quadratic equation $3x^2 - 4x - 2 = 0$ by using the formula or by any other method and show that its roots are $x = \frac{2 \pm \sqrt{10}}{3}$.
- (ii) Find the value of the root $x > 0$ taking $\sqrt{10}$ as 3.16.
4. (a) (i) Simplify $(x+1)^2 + 5(x+1) + 4$.
- (ii) Factorise $3x^2 + 11x + 10$.
- (b) (i) Simplify $\frac{1}{x+1} - \frac{2}{3(x-1)}$.
- (ii) Two parcels contain wood apple and beli fruits. First parcel contains 3 wood apples and 5 beli fruits. Second parcel contains 4 wood apples and 4 beli fruits. Indicate this information by a matrix and write the order of the matrix.

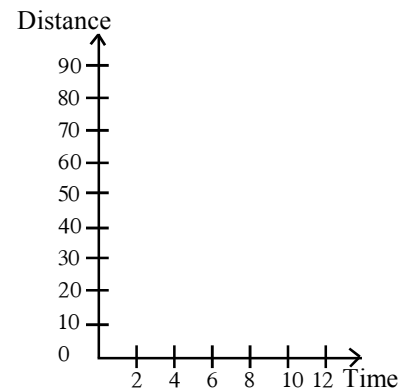
5. (a) The diagram shows a tree AB 4.5 m tall and a tower located 50 m away from it on a horizontal plane. The angle of elevation of D from B is 42° .
- (i) Copy the diagram and include the above information in it.
- (ii) Calculate the height of the tower correctly to two decimal places using trigonometric tables.



- (b) The following table presents the distance traveled by a moving object and the time taken for it.

Time (second)	2	4	6	8	10	12
Distance(metres)	10	20	30	50	70	90

- (i) Draw the given axes on the answer script and on it draw a distance-time graph to show the motion of the object.
- (ii) Show that the speed of the object in the final 6 seconds is twice its speed in the initial 6 seconds.



6. The following frequency distribution indicates the amount of rice sold by a sales outlet on each day during 30 days of a month.

- (i) What is the modal class of this distribution?

- (ii) As there are 2 500 kg of rice in the store, the merchant assumes that the rice is enough for the period of three months (90 days) to come. On the basis of the mean of the amount of rice sold per day, decide with reasons whether the assumption of the merchant is acceptable or not.

Amount of rice sold in a day (kg)	Number of days (f)
0 - 8	1
8 - 16	2
16 - 24	6
24 - 32	10
32 - 40	5
40 - 48	4

Part B

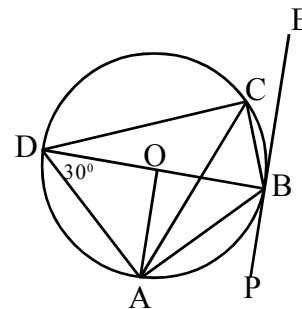
7. (a) On January 1st, Tanushi deposited Rs. 25 in her till with the idea that every month she will deposit Rs.10 more than the amount she did in the previous month.
- (i) Write the amounts of money Tanushi deposited in the first three months in the respective order. What type of progression is it?
 - (ii) In which month does Tanushi deposit Rs. 195?
 - (iii) Tanushi's target is to collect Rs. 3 000 in two years. Explain giving reasons whether Tanushi can achieve her target?

(b) Find the sum of the first 10 terms of the geometric progression 2, 4, 8,

8. In the triangle ADC, A is a right angle. E is the mid point of AC. The perpendicular drawn to AC at E meets DC at B.

- (i) Draw a diagram to indicate the above information and show that BAD is an isosceles triangle.
- (ii) Show that $AC^2 + AD^2 = 4AB^2$.

9. The tangent drawn to the circle of centre O at B is PE.

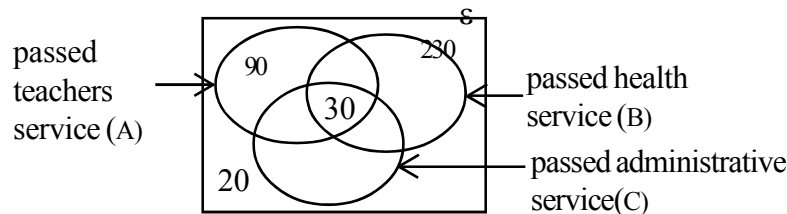


- (i) Find the value of \hat{AOB} if $\hat{ADB} = 30^\circ$. Give reasons.
 - (ii) Write the theorem for the equality $\hat{ADB} = \hat{ACB}$.
 - (iii) Give reasons for $\hat{ABP} = 30^\circ$.
 - (iv) Show that AOB is an equilateral triangle.
 - (v) A student says that the lines AB and DC are parallel. Explain with reasons whether you agree or not with this statement.
10. (i) Construct the triangle in which $BC = 7.8$ cm, $BA = 6.4$ cm and $\hat{ABC} = 60^\circ$.
- (ii) Construct the locus of a point equidistant from the points A and B.
 - (iii) Construct the circle which touches AC at A and passes through the point B.
 - (iv) Measure and write the radius of that circle.
 - (v) Mark point P which is 6 cm away from both points A and B.
 - (vi) Construct the rhombus whose side length is 6 cm and of which AB is a diagonal.

11.(a) Show that the number of solid spheres of radius $2r$ that can be made by melting a 2.24 m long uniform cylindrical solid metal rod of radius r cm is $\frac{21}{r}$.

(b) Simplify $\frac{(3.275)^2 \times 0.654}{26.52}$ using the logarithms table and give the answer correct to two decimal places.

12.(a) To recruit personnel to the teacher's service, health service and administrative service, an examination is held under three sections A, B, and C. The candidates should pass A for the teachers' service, B for the health service and C for the administrative service. The number who sat the examination was 460. 100 passed A and C. 90 passed B and C. 50 passed only A and B.



- (i) Copy the Venn diagram and complete it with the given information.
- (ii) How many have passed both the teachers' service and the health service parts?
- (iii) How many have passed only the administrative service part from the three sections?

(b) When issuing a driving licence, first a written test is held and a practical test is held for those who pass the written test. Those who qualify from both are given the licence. The probability of a candidate passing the written test is $\frac{3}{5}$ and passing the practical test is $\frac{3}{4}$.

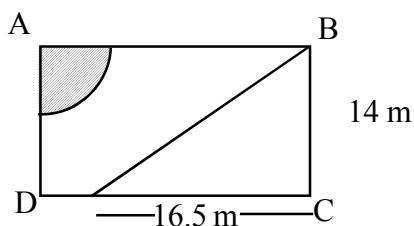
- (i) Draw a tree diagram indicating the probabilities of passing and failing the two tests.
- (ii) Find the probability of a candidate passing both the written and practical tests.
- (iii) If 500 sit the written test, how many would be expected to get the driving licence?

Mathematics - I Part B

- (1) (a) (i) Fraction of the land divided among the children $= 1 - \frac{1}{5} = \frac{4}{5}$ ---①
- (ii) Fraction of the land received by the son $= \frac{1}{2}$ of $\frac{4}{5} = \frac{2}{5}$ ---①+①
- (iii) Fraction of the land received by the three daughters $= \left(\frac{4}{5} - \frac{2}{5}\right) = \frac{2}{5}$ ---①
- (iv) Fraction of the land received by a daughter $= \frac{1}{3}$ of $\frac{2}{5} = \frac{2}{15}$
- $\therefore \frac{2}{15} \rightarrow 30$ ---①
- Area of the total land $= 30 \times \frac{15}{2} = 225ha$ ---①
- (v) Value of the part received by a daughter
- $\frac{1}{5} = 4.5$ million ---①
- $\frac{1}{15} = 1.5$ million ---②
- $\frac{2}{15} = 3$ million ---① ⑩
- (2) (i) Length of the curved boundry $= \frac{1}{4} \times 2\pi r$
- $= \frac{1}{4} \times 2 \times \frac{22}{7} \times 7m$ ---①
- $= 11m$ ---①
- (ii) Gotukola grown area $= \frac{1}{4} \times \pi r^2$
- $= \frac{1}{4} \times \frac{22}{7} \times 7m \times 7m$ ---①
- $= 38.5m^2$ ---①
- (iii) Area of the whole land $= 20m \times 14m = 280m^2$ ---①
- Area of the remaining part $= 280m^2 - 38.5m^2 = 241.5m^2$ ---①
- (iv) Three times the grown area $= 3 \times 38.5m^2 = 115.5m^2$ ---①
- Area of the triangular plot of land $= \frac{1}{2}BC \times x$
- $\therefore \frac{1}{2}BC \times x = 115.5$

$$\frac{1}{2} \times 14 \times x = 115.5 \quad \text{--- ①}$$

$$\therefore x = 16.5 \text{ m} \quad \text{--- ①}$$



--- ①

10

(3) (i) $\frac{50\,000}{10} = 5\,000 \quad \text{--- ②}$

(ii) $5\,000 \times 2 = 10\,000 \quad \text{--- ①}$

(iii) $4 \times 5\,000 = 20\,000 \quad \text{--- ①}$

(iv) Dividend income $= 5\,000 \times 2 \text{ Rs. } 10\,000$
 Capital gain $= 4 \times 5\,000 = \text{Rs. } 20\,000 \quad \text{--- ①}$
 Dividend income and capital gain $= 10\,000 + 20\,000 \quad \text{--- ①}$
 $= \text{Rs. } 30\,000 \quad \text{--- ①}$

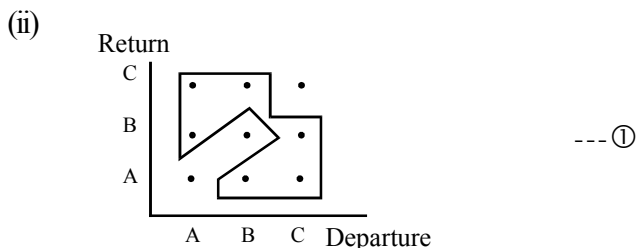
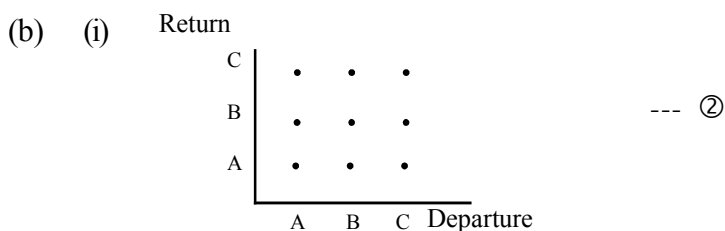
As a percentage of invested amount $= \frac{30\,000}{50\,000} \times 100\% = 60\% \quad \text{--- ①}$

(v) Total income by investing Rs. 100 000 $= 100\,000 + 60\,000$
 $= \text{Rs. } 160\,000 \quad \text{--- ② 10}$

(4) (a) (i) $P = \{ \text{Multiples of 3 less than 13} \} \quad \text{--- ①}$

(ii) $P \cap Q' \quad \text{--- ②}$

(iii) $n(P \cap Q) = 2 \quad \text{--- ②}$



$$\frac{6}{9} \text{ or } \frac{2}{3} \quad \text{--- ② 10}$$

(5) (i)

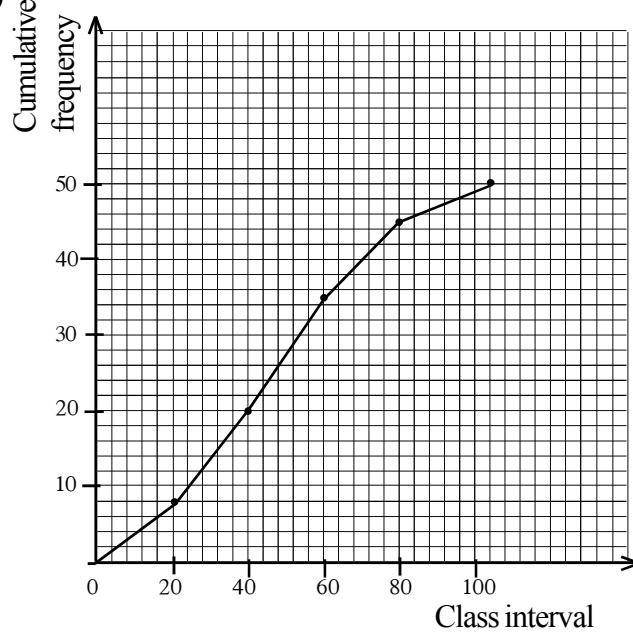
Class interval (Donation)	Frequency (Number of students)	Cumulative frequency
0 - 20	8	8
20 - 40	12	20
40 - 60	15	.....35
60 - 80	10	.....45
80 - 100	.....5	50

--- ①
--- ①
--- ①

(ii) 40-60

--- ①

(iii)



Axes --- ①
Points --- ①
Curve --- ①
Connecting curve to 0 --- ①

(iv) $(0 \times 8) + (20 \times 12) + (40 \times 15) + (60 \times 10) + (80 \times 5) = 1840$

--- ②




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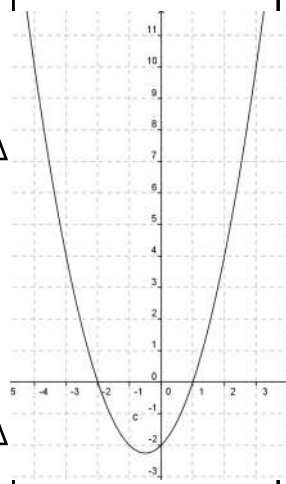
OL/1/32-S-1

Mathematics Question Paper - I

Mathematics II

Question No.		Answer	Marks	Other
1	(i)	$360\,000 \times \frac{12}{100} \times 3$ = Rs. 129 600	1 1	(2)
	(ii)	$129\,600 + 360\,000$ = Rs.489 600 $= \frac{489\,600}{36}$ = Rs.13 600	1 1 1	(4)
	(iv)	$360\,000 \times \frac{2}{100}$ = Rs. 7 200	1 1	(2)
	(v)	$7\,200 \times 36 = 259\,200,$ $360\,000 > 259\,200$ Loan not exceeding the income	1 1	(2)
				10

Question No.		Answer	Marks	Other
2	(a) (i)	obtain 0	1	(1)
	(ii)	Calibrating axes / Marking the points Drawing the curve	1+1 1	(3) 
	(b) (i)	$x = -\frac{1}{2}$	1	
	(ii)	$x = -2$ and $x = 1$	2	
	(iii)	$-2 < x < 1$	2	(5) 
	(c)	$y = (x + 1)(x - 3)$	1	(1) 
			10	

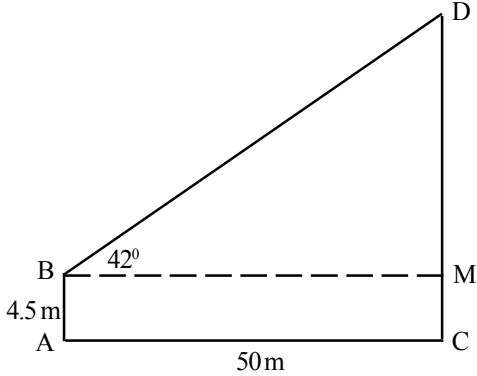

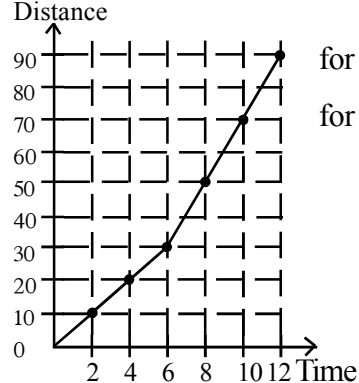



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OL/1/32-S-1

Mathematics Question Paper - I

Question No.		Answer	Marks	Other	
3	(a)	(i) If price of an orange is x and the price of a guava fruit is y $x + 15 = y$ $2x + y = 165$	2	(2)	
		(ii) $x - y = -15$ --- (i) $2x + y = 165$ --- (2) (1) + (2) $3x = 150$ $x = 50$ $y = 65$ Price of an orange = Rs 50 Price of a guava fruit = Rs. 65	1 1 1 1	(4)	
		(iii) $50 \times 2 + 65 \times 2 = 230$ Number of guavas is 2 and the number of oranges is 2 for Rs. 230	1	(1)	7
	(b)	(i) $x = \frac{4 \pm \sqrt{16 - 4 \times 3 \times -2}}{2 \times 3}$ $x = \frac{4 \pm 2\sqrt{10}}{6} = \frac{2 \pm \sqrt{10}}{3}$	1 1		
		(ii) $\frac{2 + 3.16}{3} = 1.72$	1	(3)	3
					10
Question No.		Answer	Marks	Other	
4	(a)	(i) $x^2 + 2x + 1 + 5x + 5 + 4$ $x^2 + 7x + 10$	2 1	(3)	
		(ii) $3x^2 + 11x + 10$ $(x + 2)(3x + 5)$	2	(2)	5
	(b)	(i) $\frac{3(x-1) - 2(x+1)}{(x+1)3(x-1)} = \frac{3x-3-2x-2}{(x+1)3(x-1)}$ $\frac{x-5}{3(x+1)(x-1)}$	2 1	(3)	
		(ii) $\begin{pmatrix} 3 & 5 \\ 4 & 4 \end{pmatrix}$ Order of the matrix = 2×2	1 1	(2)	5
				10	

Question No.	Answer	Marks	Other
(5) (a) (i)	 <p>To mark 4.5 m and 50 m</p> <p>To mark the angle of elevation</p>	1 1 (2)	
	(ii) From triangle BDM $\tan 42^\circ = \frac{DM}{BM}$ $0.9009 = \frac{DM}{50}$ 45.05 <p>Height of the tower = $(45.05 + 4.5) = 49.55$ m</p>	1 1 1 1 1 (4)	
(b) (i)	 <p>for first 3 points</p> <p>for last 3 points</p>	1 1 (2)	
	(ii) Speed in initial 6 seconds = $\frac{30 - 10}{6 - 2} = \frac{20}{4} = 5 \text{ms}^{-1}$ Speed in final 6 seconds = $\frac{90 - 30}{12 - 6} = \frac{60}{6} = 10 \text{ms}^{-1}$ Speed in final 6 seconds is twice the speed in initial 6 seconds. $(10 = 5 \times 2)$	1 1 (2)	 10

Question No.	Answer	Marks	Other																																													
(6)	<table border="1" style="width:100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width:25%;">Amount of rice sold in a day (kg)</th> <th style="width:10%;">No. of days (f)</th> <th style="width:10%;">Mid value (x)</th> <th style="width:10%;">Deviation (d)</th> <th style="width:10%;">fd</th> </tr> </thead> <tbody> <tr><td>0 - 8</td><td>1</td><td>4</td><td>-24</td><td>-24</td></tr> <tr><td>8 - 16</td><td>2</td><td>12</td><td>-16</td><td>-32</td></tr> <tr><td>16 - 24</td><td>6</td><td>20</td><td>-8</td><td>-48</td></tr> <tr><td>24 - 32</td><td>10</td><td>28</td><td>0</td><td>0</td></tr> <tr><td>32 - 40</td><td>5</td><td>36</td><td>+8</td><td>+40</td></tr> <tr><td>40 - 48</td><td>4</td><td>44</td><td>+16</td><td>+64</td></tr> <tr><td>48 - 56</td><td>2</td><td>52</td><td>+24</td><td>+48</td></tr> <tr><td></td><td>30</td><td></td><td></td><td>-104 +152</td></tr> </tbody> </table>	Amount of rice sold in a day (kg)	No. of days (f)	Mid value (x)	Deviation (d)	fd	0 - 8	1	4	-24	-24	8 - 16	2	12	-16	-32	16 - 24	6	20	-8	-48	24 - 32	10	28	0	0	32 - 40	5	36	+8	+40	40 - 48	4	44	+16	+64	48 - 56	2	52	+24	+48		30			-104 +152		
	Amount of rice sold in a day (kg)	No. of days (f)	Mid value (x)	Deviation (d)	fd																																											
	0 - 8	1	4	-24	-24																																											
	8 - 16	2	12	-16	-32																																											
	16 - 24	6	20	-8	-48																																											
	24 - 32	10	28	0	0																																											
	32 - 40	5	36	+8	+40																																											
	40 - 48	4	44	+16	+64																																											
	48 - 56	2	52	+24	+48																																											
		30			-104 +152																																											
	$\sum fd = +48$																																															
(i)	Modal class = 24 - 32	1	①																																													
(ii)	Column of mid values	1																																														
	Column of deviations	1																																														
	Column of fd	1																																														
	$\sum fd = +48$	1																																														
	Mean = $28 + \frac{\sum fd}{30}$ $= 28 + \frac{48}{30}$ $= 29.6$	1																																														
	Mean = 30 kg	1	⑦																																													
(iii)	Amount expected to be sold in 90 days $= 30 \times 90 \text{ kg} = 2700 \text{ kg}$ $2700 > 2500$ His assumption is not acceptable. 2500 kg is not enough.	1	②																																													
		1	10																																													

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OL/1/32-S-1

Mathematics Question Paper - I

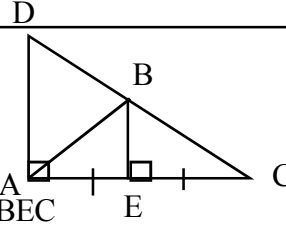


Question No.			Answer	Marks		Other
(7)	(a)	(i)	25, 35, 45,arithmetic progression.	1	①	
		(ii)	$T_n = a + (n - 1)d$	1		
			$195 = 25 + (n - 1)10$			
			$170 = (n - 1) 10$			
			$n = 18$	1	②	
	(b)	(iii)	$S_n = \frac{n}{2}(2a + (n - 1)d)$	1		
		$S_{24} = \frac{24}{2}\{2 \times 25 + (24 - 1)10\}$	1			
		$= 12(50 + 230)$				
		$= 12 \times 280 = 3360$	1			
		$3000 < 3360$				
	Thanushi can achieve her target.	1	④	△ 7		
	$S_n = \frac{a(r^n - 1)}{(r - 1)}$	1				
	$= \frac{2(2^{10} - 1)}{2 - 1}$					
	$= 2 \times 1\ 023 = 2\ 046$	2		△ 3		
					10	

Question No.

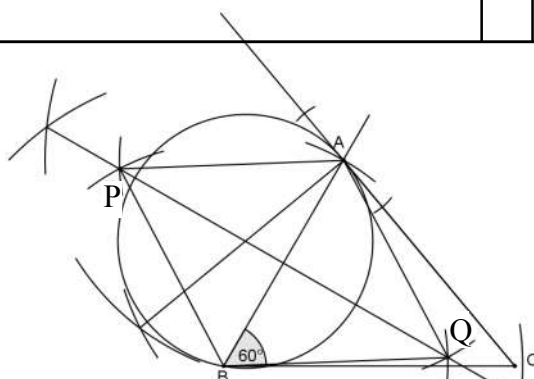
Answer

Marks

Other

(8)	(i)	<p align="center">  </p> <p>In the triangles ABE and BEC $AE = EC$ (given) $\hat{AEB} = \hat{BEC}$ (given) $BE = BE$ (common) $\therefore \triangle AEB = \triangle BEC$ (S.A.S) $\hat{EBA} = \hat{ECB}$ (corresponding angles of congruent triangles) $\hat{EBA} = \hat{BAD}$ (EB//AD, alternate angle) $\hat{ECB} = \hat{ADB}$ (EB//AD, corresponding angle) $\therefore \hat{BAD} = \hat{ADB}$ $\therefore BA = BD$ $\therefore \triangle BAD$ is an isosceles triangle.</p>	2			
	(ii)	<p>Applying Pythagoras' theorem to $\triangle ACD$ $AC^2 + AD^2 = CD^2$ $AC^2 + AD^2 = (DB + BC)^2$ $AC^2 + AD^2 = (2BC)^2$ (BD = BC) $AC^2 + AD^2 = 4AB^2$ (AB = BC)</p>	5	⑦		
			3	③		10
Question No.	Answer	Marks			Other	
(9)	(i)	$\hat{AOB} = 60^\circ$ (angle subtended at centre = $2 \times$ angle subtended on circumference)	1			
	(ii)	Angles in the same segment of a circle are equal.	1	②		
	(iii)	Angle between tangent and chord is equal to the angle in the alternate segment.	1	①		
	(iv)	$\hat{OAB} = \hat{OBA} = 60^\circ$ $\therefore OA = OB = AB$ $\therefore OAB$ is an equilateral triangle.	2	②		
	(v)	$\hat{OBA} = 60^\circ$ (OAB is an equilateral triangle.) $\hat{DCA} = 60^\circ$ (angles of the same segment)	1			
		$\hat{OAB} = 60^\circ$ $\hat{DCA} \neq \hat{CAB}$ DC and AB are not parallel.	1			
		do not agree	1	③		10

	(ii) Perpendicular bisector of AB	1	(1)	
	(iii) Perpendicular at A to AC	1		
	Mark the centre	1		
	Drawing the circle correctly	1	(3)	
	(iv) Radius of the circle	1	(1)	
	(v) Marking the point P	1	(1)	
	(vi) Completing the Rhombus APBQ.	1	(1)	
				10



Question No.	Answer	Marks	Other
(11) (a)	Volume of the rod = $\pi r^2 h = \pi r^2 \times 224 \text{cm}^3$ = $224\pi r^2 \text{cm}^3$	2	
	Volume of a sphere = $\frac{4}{3}\pi(2r)^3$	1	
	Number of spheres made = $\frac{224\pi r^2}{\pi \cdot 8r^3} \times \frac{3}{4}$	1	
	= $\frac{28 \times 3}{r \times 4} = \frac{21}{r}$	1	(5) $\triangle 5$
(b)	$A = \frac{(3.275)^2 \times 0.654}{26.52}$		
	$\lg A = 2 \lg 3.275 + \lg 0.654 - \lg 26.52$	1	
	= $2 \times 0.5152 + \bar{1}.8156 - 1.4235$	1	
	= $1.0304 + \bar{1}.8156 - 1.4235$	1	
	= $0.8460 - 1.4235 = \bar{1}.4225$	1	
	Antilog $\bar{1}.4225 = 0.2645$	1	(5) $\triangle 5$
			10